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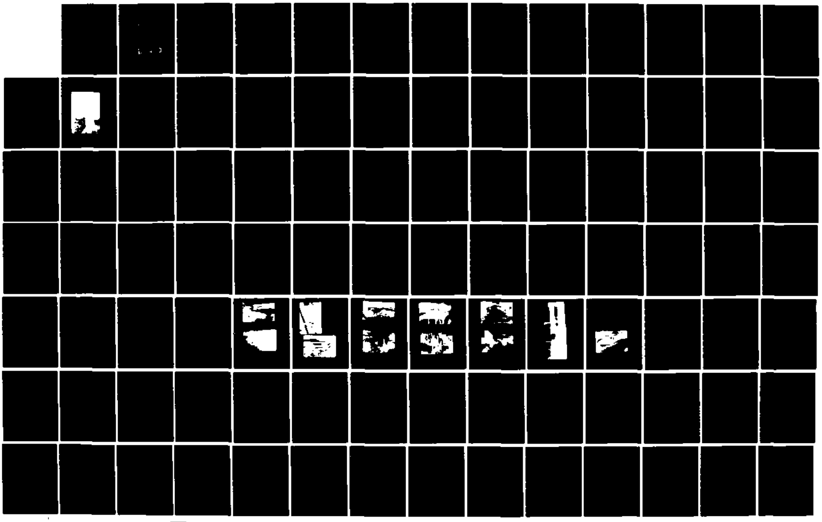

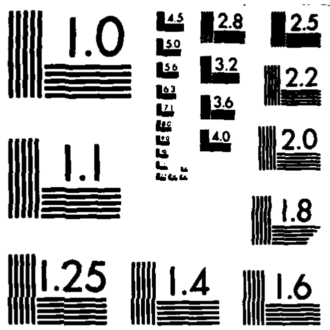

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PENOBSCOT RIVER BASIN
SEBEC, MAINE

SEBEC DAM
ME 00163

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

JUNE, 1981

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER ME 00163	2. GOVT ACCESSION NO. A155 796	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Sebec Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		12. REPORT DATE June 1981
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17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Penobscot River Basin
Sebec Maine
Sebec River

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The dam is about 276 ft. long with a height if 16 ft. The dam is considered to be in fair condition. Continued spalling and erosion of the gate strucure concrete could eventually compromise its structural stability. It is large in size w th a hazard classification of significant. It is recommended that the owner engage a qualified engineer to further assess the spalled and eroded concrete of the old power station and fishway.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:
NEDED

AUG 07 1981

Honorable Joseph E. Brennan
Governor of the State of Maine
State Capitol
Augusta, Maine 04330

Dear Governor Brennan:

Inclosed is a copy of the Sebec Dam (ME-00163) Phase I Inspection Report, prepared under the National Program for Inspection of Non-Federal Dams. This report is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. I approve the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is vitally important.

Copies of this report have been forwarded to the Department of Agriculture and to the owner, Bangor Hydro-Electric Company, Bangor, Maine. Copies will be available to the public in thirty days.

I wish to thank you and the Department of Agriculture for your cooperation in in this program.

Sincerely,

C. E. Edgar III

C. E. EDGAR, III
Colonel, Corps of Engineers
Commander and Division Engineer

Incl
As stated

PENOBSCOT RIVER BASIN

SEBEC DAM

ME 00163

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY

NEW ENGLAND DIVISION, CORPS OF ENGINEERS

WALTHAM, MASSACHUSETTS 02154

FEBRUARY, 1981

LETTER OF TRANSMITTAL

FROM THE CORPS OF ENGINEERS TO THE STATE

TO BE SUPPLIED BY THE CORPS OF ENGINEERS

BRIEF ASSESSMENT

PHASE I INSPECTION REPORT

NATIONAL PROGRAM OF INSPECTION OF DAMS

Identification Number:	ME00163
Name of Dam:	SEBEC DAM
Town:	SEBEC
County and State:	PISCATAQUIS COUNTY, MAINE
Stream:	SEBEC RIVER
Date of Inspection:	NOVEMBER, 1980

The dam, constructed prior to 1882, is a rock-filled timber crib structure, capped and liberally reinforced with concrete, approximately 276 feet long and 16 feet in height. The structure includes a 20-foot long abutment section on the left, a 178-foot spillway section, a 20-foot fish passage to the right of the spillway, and a 58-foot structure which forms the right abutment and contains two outlet sluice gates. The spillway is divided into two sections, 58 feet being 1 foot higher than the remaining 120 feet. Upstream and downstream faces of the dam are vertical. The two manually operated sluice gates are 11 feet wide by 10 feet high and are reported operable.

The dam impounds Sebec Lake and is on the Sebec River approximately 9.2 miles upstream of its confluence with the Piscataquis River. It is used for water storage and flow regulation for downriver hydro-electric facilities, and seasonally for maintenance of lake level. The lake is about 11.5 miles long with a surface area of approximately 6,800 acres. Storage capacity to the top of the dam is estimated at 150,000 acre-feet.

Based upon the visual inspection and the review of available data regarding this facility, the dam is considered to be in Fair condition. Continued spalling and erosion of the gate structure concrete could eventually compromise its structural stability.

In accordance with the Corps of Engineers Guidelines and the size (LARGE) and hazard (SIGNIFICANT) classification of the dam, the Test Flood selected was equivalent to the Probable Maximum Flood (PMF). Peak inflow to the reservoir is 85,000 cfs; routed peak outflow from the dam is 43,000 cfs with the water elevation 26.5 feet above the dam crest. The spillway capacity is 9,400 cfs, (13,300 cfs w/o flashboards) which is equivalent to approximately 22% (31% w/o flashboards) of the routed Test Flood outflow from the dam. Hydraulic computations indicate that outflow in excess of approximately 15,000 cfs will be controlled by downstream channel characteristics rather than the dam, thus spillway capacity, with flashboards in place, is about 63% of the maximum outflow controlled by the dam. Without flashboards, the spillway capacity is 89% of the maximum outflow.

It is recommended that the owner engage a qualified, registered engineer to further assess the spalled and eroded concrete of the old power station and fishway (gate structure) and submit recommendations for repair and rehabilitation. This and the remedial measures which are discussed in Section 7 should be instituted within one year of the owner's receipt of this report.

Stephen D. Murray, P.E.
Project Manager
James W. Sewall Company

STATE OF MAINE
STEPHEN
D.
MURRAY
2736
REGISTERED
PROFESSIONAL ENGINEER

This Phase I Inspection Report on Sebec Dam (ME-00163) has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgement and practice, and is hereby submitted for approval.

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

JOSEPH W. FINEGAN, JR., MEMBER
Water Control Branch
Engineering Division

ARAMAST MAHTESIAN, CHAIRMAN
Geotechnical Engineering Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended uidelines for Safety Inspection of Dams, for Phase I Investigations. Copies f these guidelines may be obtained from the Office of Chief of Engineers, ashington, D.C. 20314. The purpose of a Phase I Investigation is to dentify expeditiously those dams which may pose hazards to human life or roperty. The assessment of the general condition of the dam is based upon vailable data and visual inspections. Detailed investigation, and analyses nvolving topographic mapping, subsurface investigations, testing, and deailed computational evaluations are beyond the scope of a Phase I investiation; however, the investigation is intended to identify any need for such tudies.

In reviewing this report, it should be realized that the reported conlition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases here the reservoir was lowered or drained prior to inspection, such action, hile improving the stability and safety of the dam, removes the normal load n the structure and may obscure certain conditions which might otherwise be letectable if inspected under the normal operating environment of the strucure.

It is important to note that the condition of a dam depends on numerous nd constantly changing internal and external conditions, and is evolutionary n nature. It would be incorrect to assume that the present condition of the lam will continue to represent the condition of the dam at some point in the uture. Only through continued care and inspection can there be any chance hat unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and ydraulic analyses. In accordance with the established Guidelines, the Spillvay Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff"), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a pillway will not pass the test flood should not be interpreted as necessarily osing a highly inadequate condition. The test flood provides a measure of elative spillway capacity and serves as an aide in determining the need for nore detailed hydrologic and hydraulic studies, considering the size of the lam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for ences, gates, no-trespassing signs, repairs to existing fences and railings nd other items which may be needed to minimize trespass and provide greater ecurity for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

TABLE OF CONTENTS

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General - At the time of inspection on November 4, 1980, the water level in Sebec Lake, impounded by the dam, was 7 inches over the lower spillway section, with flashboards installed. The weather was cloudy and cool. The general condition of this dam is fair.

b. Dam - This is basically a timber crib, rock filled dam with concrete renovations and additions. The timbers have been capped with concrete to produce the spillway crest and apron as shown in Photos 1 and 2. As seen in Photo 2, there is a moderate amount of leakage from between some of the timbers of the crib. This was not considered indicative of any structural deficiency. Bedrock is exposed in the area of the right abutment as shown in Photo 3. The left abutment, shown in Photo 4, is concrete enclosed by steel sheet piling. Both the piling and the concrete abutment are in good condition. A stone riprapped slope goes from this abutment for some 30 yards upstream to the stub abutment of a highway bridge. This riprap is in good condition and extends up the slope to 3 feet above the water level on the day of inspection.

On the right side of the dam, as shown in Photo 5, is a concrete intake channel and forebay leading to the substructure of a former power station. The concrete walls of the forebay are in good condition. On the left side of the forebay adjacent to the old power station, as shown in Photo 6, a fish ladder passage was added in 1978. This has not been completed and there are no current plans to complete it. A concrete training wall leads upstream from the right side of the forebay to the other abutment of the highway bridge. This training wall is of recent construction and is in good condition.

c. Appurtenant Structures

Spillway - The concrete cap forming the spillway crest and apron is in good condition with only a few small cracks and minor erosion. The timbers underneath were inaccessible for inspection.

Outlet Structure - The outlet structure is of reinforced concrete and is the substructure of a power station which burned on August 19, 1940. Two sluice gates were installed in 1960 for the two 10'x11' openings at the downstream end of the forebay, as shown in Photo 7. These gates are lifted and controlled by a trolley type manual chain hoist hung from a steel frame above the gates. The hoist and gates are reported operable. It is reported that there are generally no problems with icing of the gates during the winter. Occasionally it has been necessary to steam the gates free. There are no remaining turbines or other equipment to impede the flow of water under the powerhouse floor. As shown in the left side of Photo 8, the water exits through two 10'x10' openings in the downstream foundation wall of the power station. The concrete of this structure is still essentially sound but many surfaces are badly spalled and eroded as seen in Photo 7 and 8. Where the surface has not yet spalled, there are numerous efflorescent stains as seen in Photo 6.

The detailed engineering data required to perform an in-depth stability analysis of the dam was not available. The final assessment of the dam, therefore, must be based primarily on visual inspection, performance history, and spillway capacity computations.

c. Validity - A comparison of records, data, and visual observations reveals no significant discrepancies, other than those noted above, between design and as-built dimensions.

SECTION 2: ENGINEERING DATA

2.1 DESIGN

a. Available Data - Available data consists of the following plans by the Bangor Hydro-Electric Company, Bangor, Maine:

1. Sebec Dam, General Plan, January 23, 1961, Dwg. M-2061
2. Sebec Dam, General Plan, Nov. 19, 1975, Dwg. M-2061A
3. Sebec Lake Dam, Proposed Concrete Forebay, Aug. 29, 1977, Dwg. 3092
4. Sebec Lake Dam, Proposed Concrete Forebay, Changes to Accommodate Fishway, September 1, 1978, Dwg. 3092A

Also available was the General Plan and Elevation of Sebec Plant for Milo Light and Power Co., Sanders Engineering Co., Portland, Me., Dec. 13, 1920.

b. Design Features - The drawings, computations and inspection reports indicate the design features stated in Section 1.

c. Design Data - Design data consists of information on the drawings listed in "Available Data" and the information shown in Appendix B.

2.2 CONSTRUCTION

a. Available Data - Information as contained in any plans, drawings, or specifications previously listed in "Design Data" or Appendix B.

b. Construction Considerations - Since no original plans of the dam were available, there was no practical means to ascertain any construction changes. Post-construction changes are discussed in Section 6.3.

2.3 OPERATION

Pond level readings are taken irregularly, but as frequently as needed, to guide the operational procedures described in Section 4.1.

2.4 EVALUATION

a. Availability - Existing data was provided by the Bangor Hydro-Electric Co. and the Maine Office of Energy Resources.

b. Adequacy - Detailed hydrologic/hydraulic data were not available. Design data and field measurements were utilized in conjunction with New England Division - Army Corps of Engineers "Preliminary Guidance for Estimating Maximum Probable Discharges" to perform the computations of outflow capacity.

i. Spillway

1.	Type:	overflow
2.	Length of weir:	178 ft
3.	Crest el.	
	with flashboards	323
	without flashboards 120 ft.	321.2
	without flashboards 58 ft.	322.2
4.	Gates:	N/A
5.	Upstream channel:	natural stream
6.	Downstream channel:	natural stream
7.	General:	N/A

j. Regulating Outlets

1.	Invert:	309
2.	Size:	two 11 ft.-wide by 10-ft. high sluice gates
3.	Description:	steel wheeled gates installed over old powerhouse intakes
4.	Control mechanism	gates are operated by trolley-type chain hoist
5.	Other:	4-ft. wide fish passage at right side of dam with wood stoplogs

e. Storage

1.	Normal pool:	95,000 acre-ft
2.	Flood control pool:	N/A
3.	Spillway crest pool:	82,000 acre-ft
4.	Top of dam:	150,000 acre-ft
5.	Test flood pool:	258,000 acre-ft

f. Reservoir Surface

1.	Normal pool:	6,800 acres
2.	Flood control pool:	N/A
3.	Spillway crest:	6,800 acres ±
4.	Test flood pool:	7,400 acres ±
5.	Top of dam:	7,000 acres ±

g. Dam

1.	Type:	rock-filled crib
2.	Length:	276 ft ±
3.	Height:	21 ft ±
4.	Top Width:	10 ft ±
5.	Side Slopes:	vertical
6.	Zoning:	N/A
7.	Impervious Core:	N/A
8.	Cutoff:	steel sheeting
9.	Grout Curtain:	N/A
10.	Other:	N/A

h. Diversion and Regulating Tunnel — N/A

6. Gated spillway capacity at test flood el. 347.5 — N/A

7. Total spillway capacity at test flood el. 347.5 — 30,400 cfs w/flashboards; 31,100 cfs w/o flashboards

8. Total project discharge at top of dam el. 330.4 (controlled by tailwater) — 15,000 cfs

9. Total project discharge at test flood el. 347.5 (controlled by tailwater) — 43,000 cfs

c. Elevation (Feet, NGVD)

1. Streambed at toe of dam: 309 ±
2. Bottom of cutoff: N/A
3. Maximum tailwater: unknown
4. Recreation pool: 323
5. Full flood control pool: N/A
6. Spillway crest (Ungated):

with flashboards	323
without flashboards - 120 ft.	321.2
without flashboards - 58 ft.	322.2

7. Design surcharge (original design): N/A
8. Top of dam: 330.4
9. Test flood surcharge: 347.5

d. Reservoir

1. Length of normal pool: 11.5 mi
2. Length of flood control pool: N/A
3. Length of spillway crest pool: 11.5 mi
4. Length of pool at top of dam: 11.5 mi
5. Length of test flood pool: 11.5 mi ±

g. <u>Purpose of Dam</u> - Original purpose was water power, then hydro-electric generation. Currently used for water storage and flow regulation.

h. <u>Design and Construction History</u> - The timber crib rock-filled dam was built prior to 1882 to operate a saw mill. In about 1920, a stone masonry and concrete dam with power station was constructed by Boston Excelsior Company of Milo, Maine, about 100 feet downstream of the timber crib structure. The new dam reportedly failed as it was being filled, and the older timber crib structure was subsequently renovated and used, with the new powerhouse, for power generation. The power station was operated by Boston Excelsior and subsequent owners until it burned on August 19, 1940. The dam was later acquired by Bangor Hydro-Electric Company and has, over approximately the last 20 years, received considerable maintenance attention including concrete capping, steel sheeting and new sluice gates.

i. <u>Normal Operational Procedures</u> - Flow from the dam is controlled as necessary to supplement Piscataquis River flows at the Howland hydro-electric station downstream. An ancillary procedure is to release water as required during low flow periods to supply the intake to the Milo Water District. In addition, an effort is made to maintain Sebec Lake at approximate flashboard crest from July 1 to September 1 in deference to the Sebec Camp Owners Association.

1.3 PERTINENT DATA

a. <u>Drainage Area</u> - 327 square miles of flat and moderately rolling wooded terrain.

b. <u>Discharge at Dam Site</u> - Discharge is from over the spillway and through the two sluice gates. Elevations shown below are in feet referenced to NGVD datum.

1.	Outlet Works (conduits):	
	Two 11-ft. wide by 10-ft. high sluice gates w/water at dam top el. 330.4	6,400 cfs (total, both gates)
2.	Maximum known flood at dam site:	
	March 20, 1936	11,400 cfs
3.	Ungated spillway capacity at top of dam el. 330.4	9,400 cfs w/flashboards 13,300 cfs w/o flashboards
4.	Ungated spillway capacity at test flood el. 347.5 (controlled by tailwater)	30,400 cfs w/flashboards 31,100 cfs w/o flashboards
5.	Gated spillway capacity at normal pool el. 323	N/A

The left abutment has a top elevation of 325.0, a maximum of 16 feet in height above the streambed.

58 feet of the spillway has a crest elevation of about 322.2, while the remaining 120 feet is 1 foot lower. The entire spillway is normally operated at an elevation of about 323.0 using permanent flashboards.

The gate structure and right abutment (old powerhouse) has a top elevation of 330.4 and contains two 11-foot wide by 10-foot high steel wheeled sluice gates, both at an invert elevation of 309.1. Mounted above each gate is a steel hoist framework constructed to support a trolley-type lifting apparatus. Access to the gate structure is via the right embankment.

Elevations are in feet referenced to NGVD datum.

No instrumentation exists at this dam. There is a USGS stream gaging station on the Sebec River approximately 1,000 feet downstream of the dam.

c. Size Classification - LARGE - The dam impounds approximately 150,000 acre-feet with the pond level at the top of the dam, which at elevation 330.4 is about 21 feet above the streambed. According to the Recommended Guidelines, the dam is classified as large in size since its impoundment is greater than 50,000 acre-feet.

d. Hazard Classification - SIGNIFICANT - If the dam were to be breached, there is potential for considerable downstream damage and possible loss of a few lives. Two or three seasonally occupied structures approximately 3.8 miles downstream of the dam would be flooded to a depth of about 1 foot by the sudden 2-foot increase in stage from 5 to 7 feet above the streambed.

A breach under dry weather conditions would result in a sudden 10-foot increase in stage immediately downstream of the dam, from 5 to 15 feet. This would flood two seasonally occupied structures approximately 400 yards downstream of the dam to a depth of about 4 feet.

e. Ownership - Bangor Hydro-Electric Company
33 State Street
Bangor, Maine 04401
Attn: Mr. Douglas Morrell
(207)945-5621

f. Operator - Mr. Merle Boyer
Bangor Hydro-Electric Company
West Main Street
Milo, Maine 04463
(207)943-7371

PHASE I INSPECTION REPORT

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority - Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. James W. Sewall Company has been retained by the New England Division to inspect and report on selected dams in the State of Maine. Authorization and notice to proceed were issued to James W. Sewall Company under a letter of April 2, 1980 from William E. Hodgson, Jr. Colonel, Corps of Engineers. Contract No. DACW 33-80-C-0051 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection Program - The purposes of the program are to:

1. Perform technical inspection and evaluation of non-federal dams to identify conditions requiring correction in a timely manner by non-federal interests.

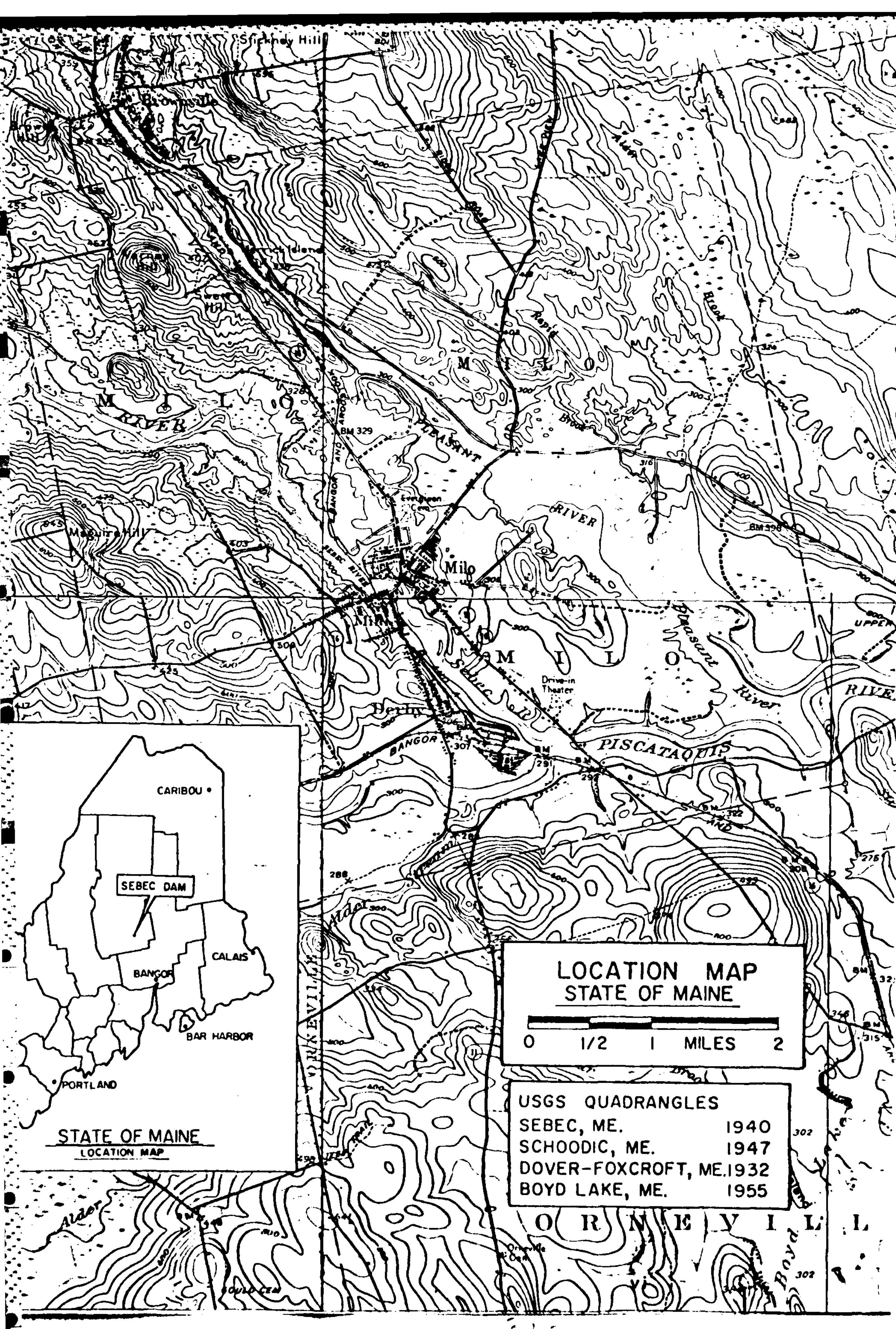
2. Encourage and prepare the States to quickly initiate effective dam inspection programs for non-federal dams.

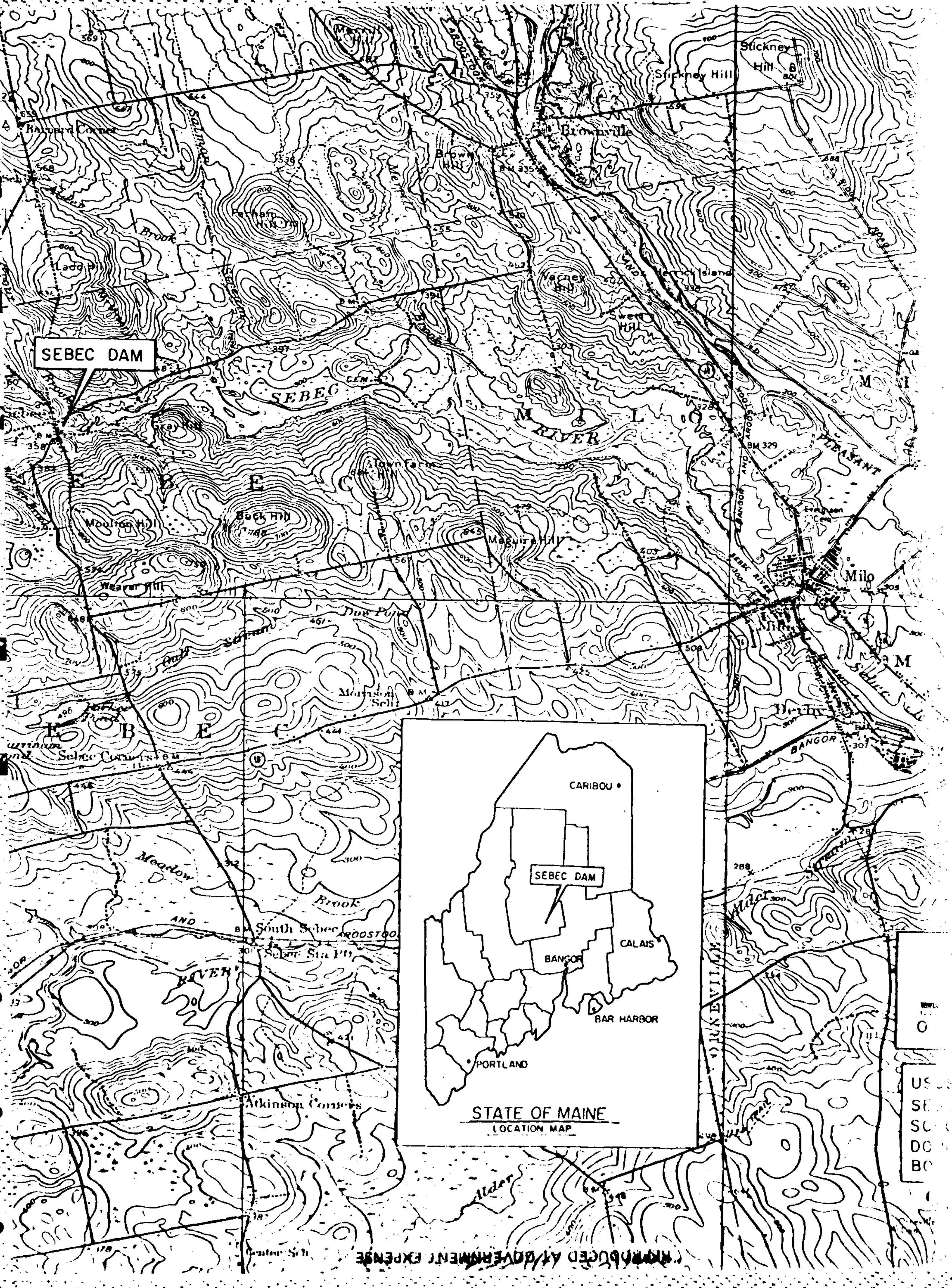
3. To update, verify and complete the National Inventory of Dams.

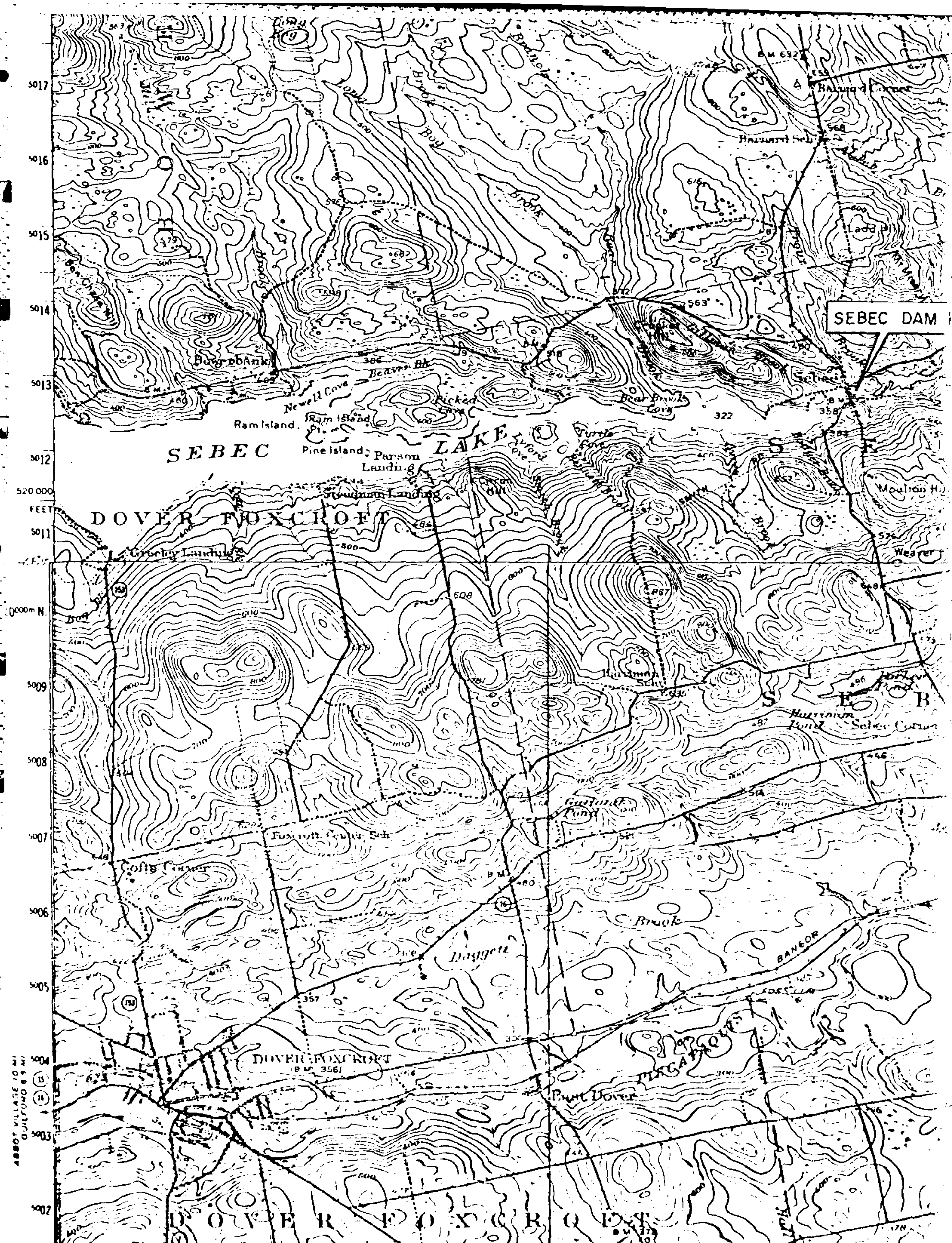
1.2 DESCRIPTION OF PROJECT

a. Location - The dam is located on the headwaters of the Sebec River about 9.2 miles upstream from its confluence with the Piscataquis River in the Town of Sebec, County of Piscataquis, State of Maine. The dam is shown on the Sebec, Me. USGS Quandrange Map having coordinates latitude N45°16.2' and longitude W69°07.0'.

b. Description of Dam and Appurtenances - The existing dam, founded on bedrock, is a roughly "Z" shaped concrete-capped timber crib structure, 276 feet in overall length, including a 20-foot long abutment section on the left, a 178-foot spillway section, a 20-foot long fish passage on the right, and the 58-foot long foundation of a now-defunct hydro-electric generating station, containing two outlet sluice gates, which forms the right abutment.


LOCATION MAP
STATE OF MAINE
0 1/2 1 MILES 2
USGS QUADRANGLES
SEBEC, ME. 1940
SCHOODIC, ME. 1947
DOVER-FOXCROFT, ME. 1932
BOYD LAKE, ME. 1955
CARIBOU
SEBEC DAM
CALAIS
BANGOR
BAR HARBOR
PORTLAND
STATE OF MAINE
LOCATION MAP
Stickney Hill
Brownville
Maguire Hill
Milo
Derby
Drive-in Theater
PISCATAQUIS
PLEASANT
RIVER
M I L O
O R N E V I L L


SEBEC DAM
Stickney Hill
Brownville
Brown Hill
Perham Hill
Ladd Hill
Brook
Gray Hill
Town Farm Hill
Buck Hill
Moulton Hill
Weaver Hill
Maguire Hill
SEBEC
RIVER
MILO
Milo
PLEASANT
BANGOR
Derby
Sebec Corners
Meadow
Brook
South Sebec
AROOSTOOK
Atkinson Corners
Alder
STATE OF MAINE
LOCATION MAP
CARIBOU
SEBEC DAM
CALAIS
BANGOR
BAR HARBOR
PORTLAND


SEBEC DAM
SEBEC LAKE
DOVER-FOXCROFT
Bowerbank
Newell Cove
Beaver Bk
Picked Cove
Ram Island
Pine Island
Parson Landing
Steadman Landing
Greeley Landing
Bear Brook Cove
Lyford Cove
Turtle Cove
Moulton Hill
Ladd Hill
Barnard Corner
Barnard Sch
Foxcroft Center Sch
Garland Pond
Daggett
Brook
East Dover
PISCATAQUIS
BANGOR
DOVER-FOXCROFT
520 000 FEET

OVERVIEW PHOTO

U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	Sebec Dam - ME 00163
JAMES W. SEWALL COMPANY CONSULTANTS OLD TOWN, MAINE		Sebec, Maine February 1, 1981

d. Reservoir Area - There are no indications of instability along the banks of the reservoir in the vicinity of the dam. The reservoir is only 50 yards wide where it is spanned by the highway bridge 30 yards upstream of the dam. Continuing upstream, Sebec Lake gradually widens to its maximum width of two miles which occurs near the upper end of its eleven mile length.

e. Downstream Channel - At the left of the old power station is an abandoned concrete fishway which also serves as a training wall below the power station, as seen on the right side of Photo 8. This concrete has moderate spalling and some efflorescence. Extending about 25 yards from the lower end of the fishway is an earth filled, stone masonry wall separating the tailrace from the main river channel as shown in Photo 9. This wall is about 10 feet wide and 8 feet high with numerous small trees growing on it. This wall is in good condition. The main downstream channel is the original riverbed, as seen in Photo 9. This is stony with areas of exposed bedrock. The banks of the river are wooded.

The first crossing of the Sebec River downstream of this dam is the Bangor and Aroostook Railroad Bridge in Milo. This is about seven miles downstream and is shown in Photo 10.

About 1,000 feet downstream of the railroad bridge, Main Street, Milo, is carried over the Sebec River on two bridges with an island between them. These are shown in Photos 11 and 12. Just upstream westerly of the two bridges is a timber crib dam seen in the foreground of Photo 13.

3.2 EVALUATION

On the basis of the visual examination this dam is considered to be in fair condition.

Continued spalling and eroding of the concrete of the old power station could endanger the integrity of the structure, possibly resulting in the uncontrolled release of the waters of Sebec Lake.

SECTION 4: OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 OPERATIONAL PROCEDURES

a. General - The basic operating procedure is to follow an operations rating curve by holding or releasing water as needed for power generation at Howland Power Station about 25 miles downstream. An accessory procedure is to release water as needed to supply the intake for the Milo Water District. In addition, an effort is made to hold the level of Sebec Lake fairly constant from July 1 to September 1 in deference to the Sebec Camp Owners Association.

During periods of heavy flow, the site is visited by operating personnel about every other day. During other periods, the visits are approximately biweekly.

b. Warning System - No warning system is known to exist.

4.2 MAINTENANCE PROCEDURES

a. General - The dam receives no regular maintenance, but rather on an "as necessary" basis.

b. Operating Facilities - Maintenance of operating facilities is minimal.

4.3 EVALUATION

The operation and maintenance procedures at this dam are inadequate to ensure that all problems encountered can be remedied within a reasonable period of time. The owner should establish a written operation and maintenance procedure as well as a warning system to follow in the event of an emergency at the dam.

SECTION 5: EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 GENERAL

The project is a low surcharge - large storage timber crib structure, originally constructed and used for hydro power production, but currently used for stream regulation and water storage.

The tributary watershed consists of 327 square miles of undeveloped terrain which is virtually 100% wooded. With NGVD elevations ranging from 320 to over 2600 feet, portions of the watershed are very steep, but average watershed slope is approximately 3%. Further, the watershed contains numerous lakes and ponds, the aggregate surface area of which comprises about 10% of the watershed area. For purposes of hydrologic computation, the watershed is thus considered relatively flat.

Adjacent to and upstream of the dam, a roadway bridge crosses the approach channel with its bottom steel about 8.2 feet above the spillway crest. This bridge produces a hydraulic effect at higher flows.

Hydraulics computations indicate that downstream channel characteristics would control discharge from the dam at flows in excess of 15,000 cfs Occurrence of the test flood would completely inundate the dam by virtue of the backwater from the downstream channel. The full spillway would accommodate about 22% of the routed Test Flood outflow from the dam, but would accommodate about 63% of the maximum flow which could be controlled by the dam.

5.2 DESIGN DATA

No design data are known to exist for this project.

5.3 EXPERIENCE DATA

The maximum known flood at the dam site occurred March 20, 1936, producing a peak outflow of 11,400 cfs. The dam reportedly failed on that date, releasing a major fraction of the storage in Sebec Lake, and contributing significantly to the severe downstream damages incurred during the general flooding at the time. No detailed information concerning the exact nature or extent of the failure was located.

5.4 TEST FLOOD ANALYSIS

The Test Flood for this significant hazard large size dam is the Probable Maximum Flood (PMF). Peak inflow to Sebec Lake is 85,000 cfs (260 csm) and was determined using the "Flat and Coastal" guide curve of the "Preliminary Guidance for Estimating Maximum Probable Discharge", dated March, 1978. Peak outflow is 43,000 cfs with the water elevation 26.5 feet above the spillway crest and the initial reservoir level assumed at the permanent flashboard crest (el. 323 NGVD). Based upon hydraulics computations, the spillway capacity is 9,400 cfs which is approximately 22% of the routed Test Flood outflow from Sebec Dam. Test Flood outflow is controlled by the reach directly

downstream of the dam, the backwater from which would, at flows in excess of about 15,000 cfs, submerge the dam. The spillway capacity is thus about 68% of that flow on which the dam would act as a control.

5.5 DAM FAILURE ANALYSIS

Utilizing the April, 1978 "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs", the peak failure outflow with the pool initially at the top of the dam (el. 330.4 NGVD) would be approximately 13,000 cfs, an increase of 3,600 cfs above the estimated 9,400 cfs pre-failure flow. The breach would cause an increase in stage immediately downstream from the dam from about 18 feet to 22 feet, which would likely cause little further damage as two seasonal residences in the area would be destroyed by the pre-failure flow. Further downstream, approximately 3.8 miles from the dam, the sudden increase in stage from 5.2 feet to 6.8 feet would be sufficient to flood two or three seasonal residences to a depth of about 1 foot. Further downstream, estimated stage increases of 1 foot or less would create little damage beyond that caused by the pre-failure flow.

The consequences of a "dry weather" failure with the water level initially at the top of the flashboards (323 NGVD) was also investigated. A pre-failure flow of about 300 cfs emanating from one sluice gate was assummed. The peak failure outflow would be 6,600 cfs. The sudden increase in stage from 5 feet to 15 feet immediately downstream from the dam would flood two seasonal residences in the area to a depth of about 4 feet. Further downstream, resulting increases in stage would be expected to cause little damage.

There is potential for considerable property damage and possible loss of a few lives, thus Sebec Dam has been classified as a "Significant Hazard" dam.

SECTION 6: EVALUATION OF STRUCTURAL STABILITY

6.1 VISUAL OBSERVATION

The visual inspection of the dam indicates the following potential problem:

Continued spalling and eroding of the concrete of the old power station could endanger the integrity of the structure possibly resulting in the uncontrolled release of the storage contained in Sebec Lake.

6.2 DESIGN AND CONSTRUCTION DATA

No original design and construction data are available for the dam.

6.3 POST-CONSTRUCTION CHANGES

The rock-filled timber crib dam is shown on the plan of Sebec Village in the 1882 Colby Atlas. There was at that time a saw mill at the site. In about 1920, an attempt was made by the Boston Excelsior Co. of Milo, Maine, to construct a stone masonry and concrete dam, together with a power station, adjacent to and downstream of, the original timber-crib structure. The new dam reportedly failed as it was being filled and the timber crib dam was subsequently renovated and utilized in conjunction with the power station. The dam sustained damage in the 1936 flood and was subsequently repaired. On August 19, 1940, the powerhouse burned. The dam was at that time owned by Maine Public Service Company. The structure has since been acquired by the Bangor Hydro-Electric Company and has, since 1960, undergone considerable renovation work, including sheet piling, concrete cap and aprons, and new sluice gates.

6.4 SEISMIC STABILITY

The dam is located in Seismic Zone 2, and in accordance with the recommended Phase 1 guidelines does not warrant seismic investigation.

SECTION 7: ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Condition - Based upon the visual inspection, the dam is judged to be in fair condition.

b. Adequacy of Information - Due to the lack of design and construction data for this dam, the assessment of safety is based solely on the visual inspection.

c. Urgency - The remedial measures and recommendations presented below should be implemented by the owner within one year after receipt of this Phase I Inspection Report.

7.2 RECOMMENDATIONS

The owner should engage a qualified registered engineer to further assess the spalled and eroded concrete of the old power station and fishway and submit recommendations for the repair and rehabilitation of the same.

The owner should implement all recommendations by the engineer.

7.3 REMEDIAL MEASURES

a. A program of annual technical inspection, with repairs as necessary, should be instituted by the owner.

b. The dam should be monitored during flood periods and a formal downstream warning system, to be implemented in the event of an emergency at the dam, should be developed by the owner.

c. A formal program of operation and maintenance procedures should be instituted and fully documented to provide accurate records for future reference.

7.4 ALTERNATIVES

This study has identified no practical alternative to the above recommendations.

APPENDIX A

VISUAL CHECK LIST WITH COMMENTS

VISUAL INSPECTION CHECKLIST
PARTY ORGANIZATION

PROJECT [illegible] Dam

DATE [illegible] 4, [illegible]

TIME 9:00

WEATHER [illegible]

W.S. ELEV. _____ U.S. _____ DN.S.

PARTY:

1. [illegible]
2. [illegible] P.E.
3. [illegible]
4. [illegible]
5.
6.
7.
8.
9.
10.

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	[illegible]	[illegible]	
2.	[illegible]	S.D.M. [illegible]	
3.	[illegible]		
4.	Spillway [illegible] Discharge Channel		
5.			
6.			
7.			
8.			
9.			
10.			

PERIODIC INSPECTION CHECKLIST

PROJECT [illegible] DATE [illegible]

PROJECT FEATURE [illegible] NAME [illegible]

DISCIPLINE [illegible] NAME [illegible]

AREA EVALUATED	CONDITION
DAM EMBANKMENT	Concrete [illegible] with [illegible] hydroelectric [illegible]. Main section of [illegible] and hydro plant founded on [illegible] on right abutment. [illegible] on glacial till.
Crest Elevation	
Current Pool Elevation	
Maximum Impoundment to Date	
Surface Cracks	
Pavement Condition	
Movement or Settlement of Crest	
Lateral Movement	None [illegible]
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Condition at abutment [illegible] is good.
Indications of Movement of Structural Items on Slopes	
Trespassing on Slopes	N. A.
Sloughing or Erosion of Slopes or Abutments	N. A.
Rock Slope Protection - Riprap Failures	N. A.
Unusual Movement or Cracking at or Near Toe	N. A.
Unusual Embankment or Downstream Seepage	N. A.
Piping or Boils	N. A.
Foundation Drainage Features	N. A.
Toe Drains	N. A.
Instrumentation System	[illegible]
Vegetation	N. A.

PERIODIC INSPECTION CHECKLIST

PROJECT ______________________ DATE ______________________

PROJECT FEATURE ______________________ NAME ______________________

DISCIPLINE ______________________ NAME ______________________

AREA EVALUATED	CONDITION
DIKE EMBANKMENT	
Crest Elevation	
Current Pool Elevation	
Maximum Impoundment to Date	
Surface Cracks	
Pavement Condition	
Movement or Settlement of Crest	
Lateral Movement	
Vertical Alignment	
Horizontal Alignment	
Condition at Abutment and at Concrete Structures	
Indications of Movement of Structural Items on Slopes	
Trespassing on Slopes	
Sloughing or Erosion of Slopes or Abutments	
Rock Slope Protection - Riprap Failures	
Unusual Movement or Cracking at or Near Toes	
Unusual Embankment or Downstream Seepage	
Piping or Boils	
Foundation Drainage Features	
Toe Drains	
Instrumentation System	
Vegetation	

PROJECT ____________ DATE ____________

PROJECT FEATURE ____________ NAME ____________

DISCIPLINE ____________ NAME ____________

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	Adjacent to the right abutment on upstream of the [illegible] there is a concrete training wall that is in good condition.
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	
Condition of Concrete	Concrete masonry, small amount of spalling with some erosion and efflorescence
Stop Logs and Slots	

PERIODIC INSPECTION CHECKLIST

PROJECT ____________________ DATE ____________________

PROJECT FEATURE ____________________ NAME ____________________

DISCIPLINE [illegible] NAME ____________________

[illegible]

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	[illegible]
a. Concrete and Structural	N.A.
General Condition	
Condition of Joints	
Spalling	
Visible Reinforcing	
Rusting or Staining of Concrete	
Any Seepage or Efflorescence	
Joint Alignment	
Unusual Seepage or Leaks in Gate Chamber	
Cracks	
Rusting or Corrosion of Steel	
b. Mechanical and Electrical	N.A.
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Service Gates	
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	

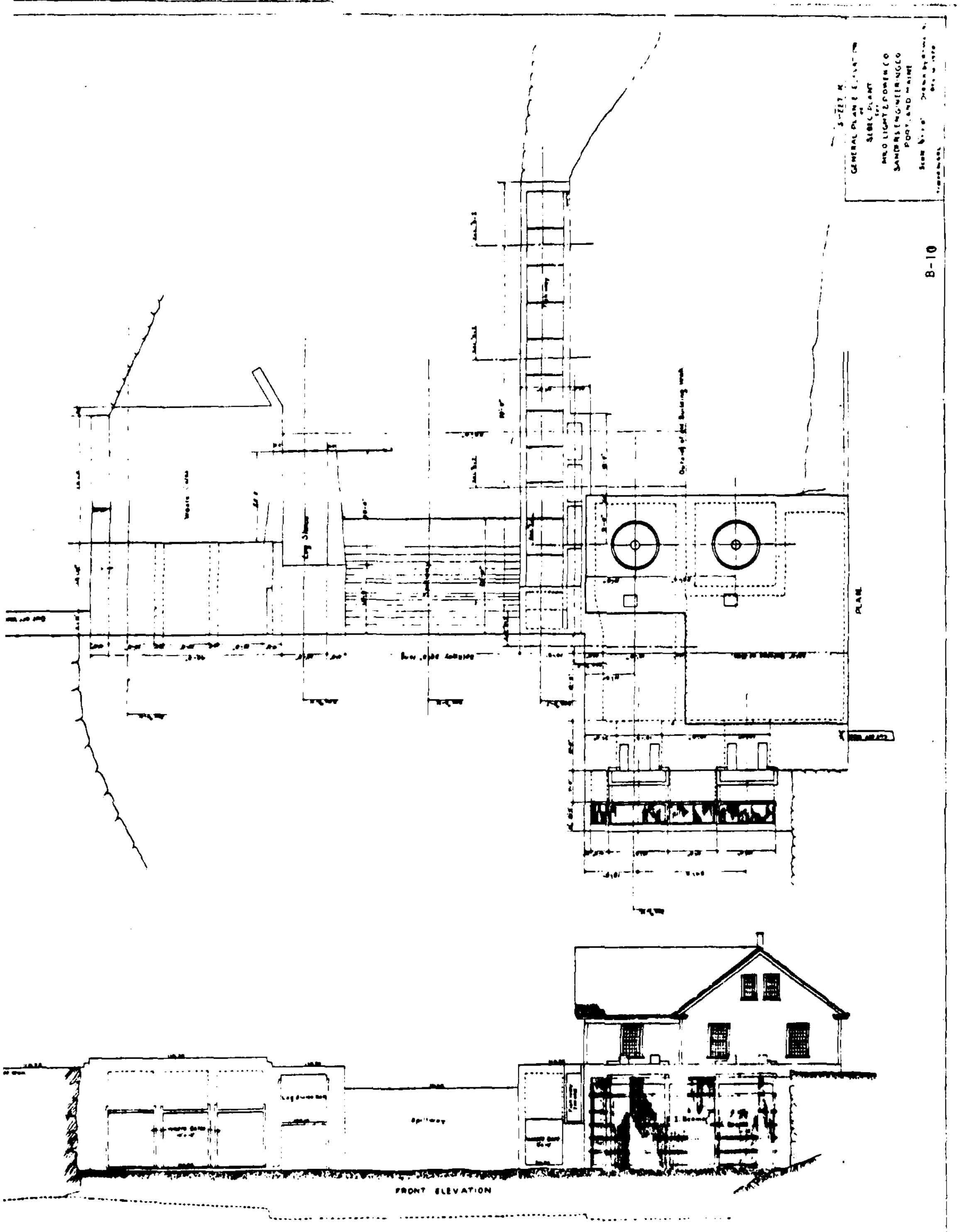
PERIODIC INSPECTION CHECKLIST

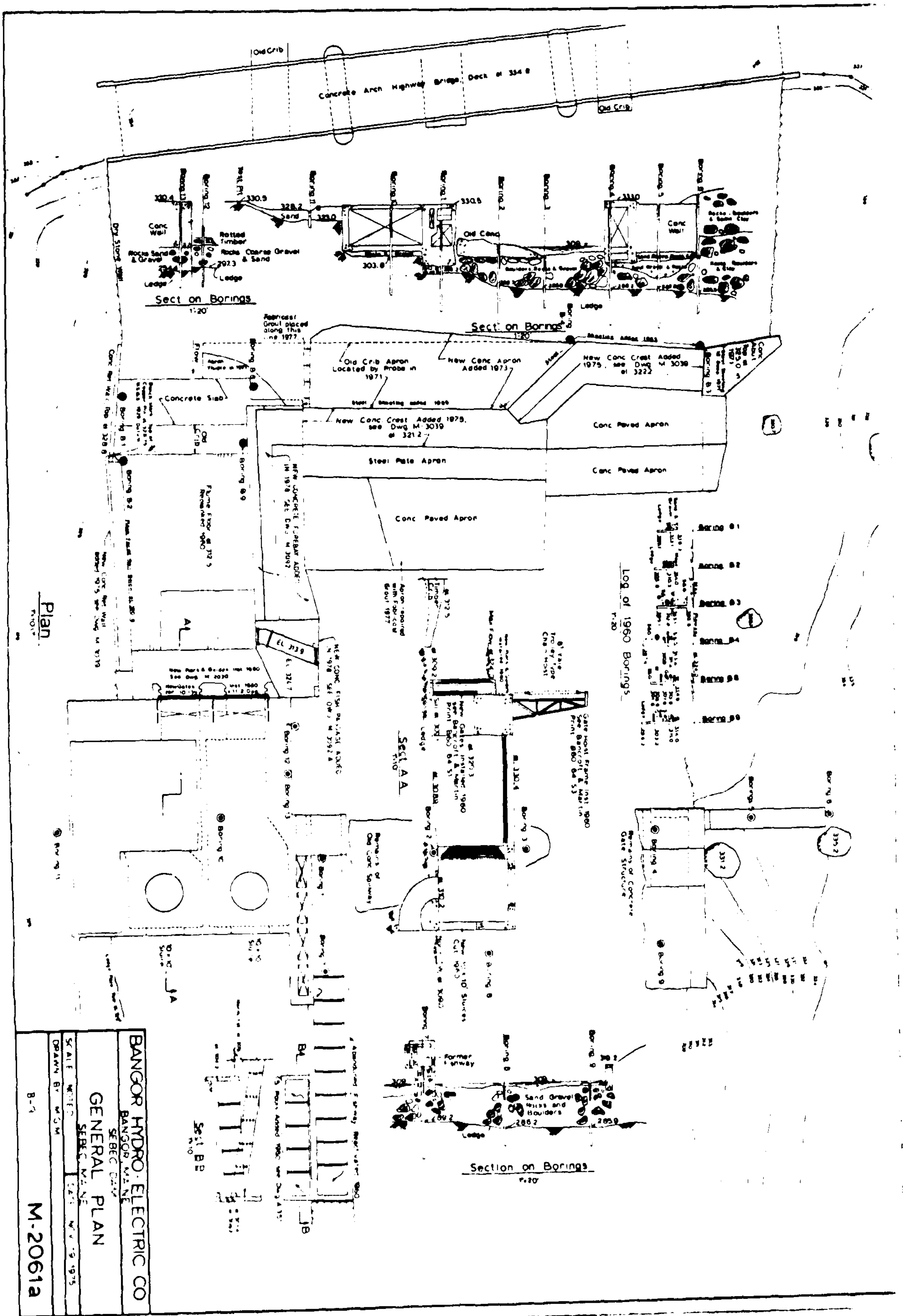
JECT	DATE
JECT FEATURE	NAME
CIPLINE	NAME

AREA EVALUATED	CONDITION
LET WORKS - TRANSITION AND CONDUIT	
eneral Condition of Concrete	
ust or Staining on Concrete	
palling	
rosion or Cavitation	
racking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

JECT [illegible]	DATE [illegible]
JECT FEATURE [illegible]	NAME [illegible]
CIPLINE [illegible]	NAME [illegible]

AREA EVALUATED	CONDITION
LET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	
Rust or Staining	[illegible]
Spalling	[illegible]
Erosion or Cavitation	[illegible]
Visible Reinforcing	[illegible]
Any Seepage or Efflorescence	There are [illegible] areas of [illegible]
Condition at Joints	
Drain holes	
Channel	
Loose Rock or Trees Overhanging Channel	[illegible]
Condition of Discharge Channel	Good


PLAN
FRONT ELEVATION
Spillway
B-10



Concrete Arch Highway Bridge Deck el 354.8
Old Crib
Sect on Borings
Conc Wall
Rocks Coarse Gravel & Sand
Ledge
Old Conc
Old Crib Apron Located by Probe in 1971
New Conc Apron Added 1973
New Conc Crest Added 1975, see Dwg M-3039 el 322.2
Concrete Slab
New Conc Crest Added 1975, see Dwg M-3039 el 321.2
Steel Plate Apron
Conc Paved Apron
Conc Paved Apron
Conc Paved Apron
Plan
Log of 1960 Borings
Sect A A
Section on Borings
Sand Gravel Rocks and Boulders
Former Fishway
Sect B B
BANGOR HYDRO-ELECTRIC CO
BANGOR, MAINE
SEBEC DAM
GENERAL PLAN
SEBEC, MAINE
M-2061a

U.S.G.S. Sebec Lake & Sebec, Me.

Fishes

Salmon	Chain pickerel
Brook trout (squaretail)	Smelt
Lake trout (togue)	Eel
Smallmouth bass	White sucker
White perch	Minnows
Yellow perch	Cusk

Physical Characteristics

Area - [illegible] acres

Maximum depth - 155 feet

Temperatures
Surface - 75° F.
150 feet - 45° F.

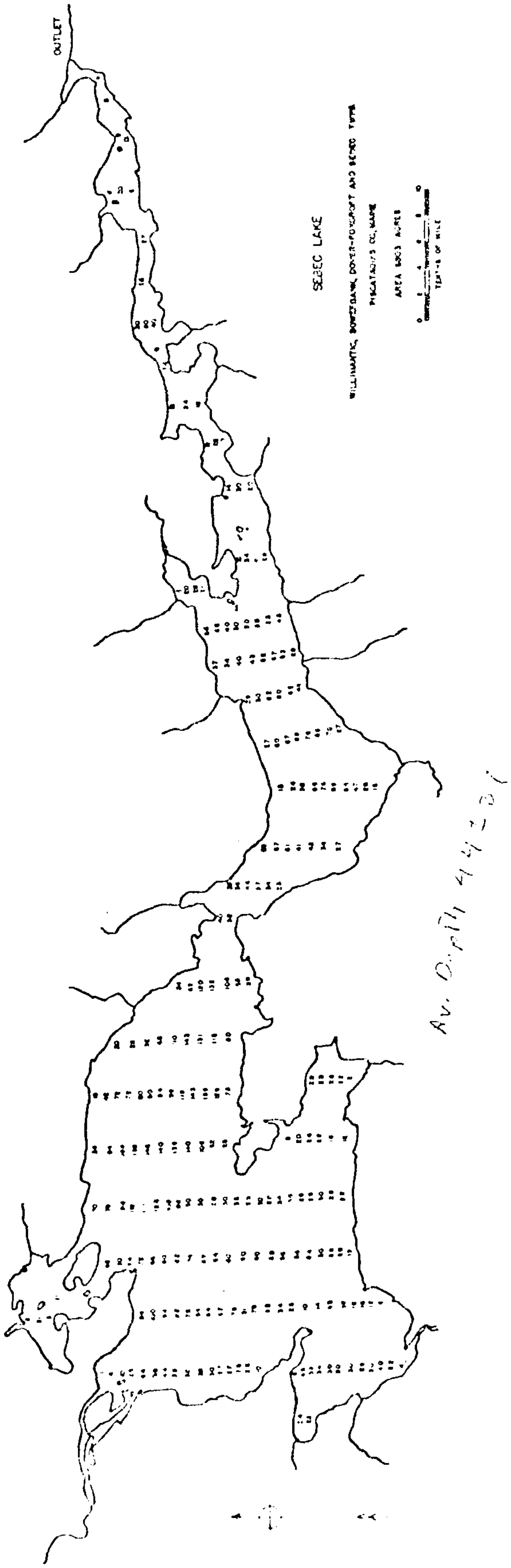
Principal fishery: Salmon, lake trout, smallmouth bass

Sebec Lake provides ideal water quality for salmonids. A large portion of the water volume is cold with abundant dissolved oxygen at all depths in late summer.

In the past Sebec Lake was managed for its fine natural salmon population. However, in the years 1961 through 1966 lake trout were stocked in order to utilize the large amount of deep water and increase the fishing potential of the lake. These togue have now become a well established population and are reproducing naturally in the lake. They are providing an excellent fishery in addition to the salmon for both summer and winter anglers.

Regulations controlling the size and bag limit of bass have been liberalized in hopes of reducing competition from this species. Presently the minimum length limit for salmon is 12 inches. This allows anglers to take advantage of large numbers of salmon that are slow to reach the normal 14-inch minimum length.

Surveyed - 1950
(Revised, 1953, 1970)
Maine Department of Inland Fisheries and Game
Published under Appropriation No. 4223.


OUTLET
SEBEC LAKE
WILLIMANTIC, BOWERBANK, DOVER-FOXCROFT AND SEBEC TWPS
PISCATAQUIS CO., MAINE
AREA 6803 ACRES
TENTHS OF MILE
Av. Depth 44 ± 3'

[illegible] SEBEC RIVER AT SEBEC, ME

LOCATION.--Lat 45°16'12", long 69°16'44", Piscataquis County, Hydrologic Unit 01020004, on right bank 1,600 ft (490 m) downstream from highway bridge and dam at outlet of Sebec Lake at Sebec.

DRAINAGE AREA.--327 mi^2 (847 km^2).

PERIOD OF RECORD.--October 1924 to current year.

REVISED RECORDS.--WSP 1171: Drainage area, 1436(M). WSP 1301: 1925.

GAGE.--Water-stage recorder. Datum of gage is 296.3 ft (90.31 m) above mean sea level. Prior to June 22, 1942, at site on opposite bank 60 ft (18 m) downstream at same datum.

REMARKS.--Records good except those for period of no gage-height record, which are fair. Flow regulated by Sebec Lake (Reservoir in Penobscot River basin) and other reservoirs upstream. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--53 years, 631 ft^3/s (17.87 m^3/s), 26.20 in/yr (665 mm/yr), unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,400 ft^3/s (323 m^3/s) Mar. 20, 1936, gage height, 14.46 ft (4.407 m), from rating curve extended above 6,000 ft^3/s (170 m^3/s) on basis of velocity-area studies; minimum, about 2 ft^3/s (0.057 m^3/s) Oct. 14-17, 1930, gage height, 0.87 ft (0.265 m), when gates in dam were closed.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,640 ft^3/s (74.8 m^3/s) Apr. 24, gage height, 6.04 ft (1.841 m); minimum daily, 77 ft^3/s (2.18 m^3/s) Oct. 20.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	600	631	380	321	585	267	1690	1910	136	1550	245	285
2	590	650	374	316	450	271	1990	1810	142	1430	240	290
3	580	638	374	316	405	267	2040	1740	145	1040	245	290
4	570	669	354	307	400	197	2090	1630	148	437	245	280
5	560	1020	340	307	395	216	2080	1530	151	503	245	280
6	540	1250	330	303	390	209	2060	1430	154	434	245	280
7	491	1240	345	299	385	201	1960	1380	161	401	240	276
8	440	1200	457	299	375	193	1870	1280	168	390	236	267
9	457	1130	547	307	370	186	1800	1060	164	316	236	262
10	669	1020	566	307	365	186	1780	984	161	209	232	262
11	696	947	572	307	360	189	1780	969	164	205	236	262
12	676	890	566	307	355	205	1700	947	168	205	236	262
13	644	835	560	305	350	228	1430	619	158	205	236	262
14	638	762	534	305	345	340	1510	105	148	209	236	262
15	595	743	503	305	335	601	1600	105	148	209	236	480
16	560	702	485	300	335	911	1670	105	145	205	262	1110
17	497	676	474	300	325	1450	1750	110	139	213	290	1070
18	468	553	462	300	325	1550	1860	112	145	249	294	1040
19	193	457	434	300	320	1560	1990	120	154	249	290	1010
20	77	534	412	294	315	1500	2120	125	171	245	290	962
21	112	485	401	290	310	1380	2250	125	193	245	290	897
22	117	457	390	290	305	1260	2410	125	197	245	290	835
23	154	457	374	303	300	1170	2560	125	253	245	290	743
24	232	429	374	294	295	1100	2610	128	285	245	290	644
25	321	406	369	290	290	1060	2610	130	316	245	290	563
26	434	395	359	290	285	1070	2540	130	457	245	290	522
27	516	395	354	290	285	1070	2420	130	702	245	290	572
28	547	390	354	290	280	1100	2310	130	801	245	290	855
29	553	401	340	290	---	1110	2190	136	815	240	280	918
30	553	395	335	285	---	1170	2040	136	1260	240	280	977
31	566	---	330	425	---	1380	---	136	---	245	265	---
TOTAL	14646	20817	13049	9442	9635	23617	60620	19522	8349	11649	8180	17038
MEAN	472	694	421	305	351	762	2021	630	278	376	264	568
MAX	696	1250	572	425	585	1560	2610	1910	1260	1550	294	1110
MIN	77	390	330	285	280	186	1430	105	136	205	232	262
MEAN‡	686	641	380	224	115	1005	2181	537	601	190	209	579
CFSM‡	2.10	1.96	1.16	.68	.35	3.07	6.67	1.64	1.84	.58	.64	1.77
IN.‡	2.42	2.19	1.34	.79	.37	3.54	7.44	1.89	2.05	.67	.74	1.98

CAL YR 1976 TOTAL 317198 MEAN 867 MAX 5210 MIN 77 MEAN‡ 866 CFSM‡ 2.65 IN.‡ 36.08
WTR YR 1977 TOTAL 216764 MEAN 594 MAX 2610 MIN 77 MEAN‡ 612 CFSM‡ 1.87 IN.‡ 25.42

‡ Adjusted for change in contents in Sebec Lake.
NOTE.--No gage-height record Jan. 30 to Mar. 3.

26 Generators

No. of Units	Make	Date Installed	K. W. Per Unit	Voltage	Amp.	Capacity K.V.A.

27 Steam Plant Capacity K.W. H.P.

28 Fuel

29 Remarks

(PASTE PHOTO HERE)

30 Information furnished by R. E. Stratton Title Hyd. Engr.,
Bangor Hydro-Electric Company

31 Information obtained by R. A. Ranger Date 9-28-1964
PUC Engineer

MEOO791
10-28-80

P. U. C. & U. S. G. S.

WATER POWER CENSUS

River Sebec at Sebec

Major River Basin Penobscot River Sub-basin 1 Piscataquis R.

Sub-basin 2 Sebec River Sub-basin 3

1 Owner Bangor Hydro-Electric Company

2 Address 33 State St, Bangor, Me. Drainage Area 327 sq. mi.

3 Location of Plant Outlet Sebec Lake

4 Use of Power None generated, storage only

5 Plant Capacity (H. P.) none

6 Hours Operated — Weekdays Sat.

Sun. Mo. in Year

7 Dam: Elev. Crest ~~322.2 58 ft~~ 321.2 120 ft Date Built 1921 Reconstructed 1936

8 Length — Between abutments 178 ft. — Spillway 178 ft.

9 Type and Material Rock filled wood crib, concrete gate structure

10 Foundation Earth and ledge

11 Height — Maximum 15 ft

12 Flashboards — Height 2 ft - 58 ft ~~3 ft - 120 ft~~ Type Wood, steel pin

13 Storage 1,880 Cu. Ft. 1,990,000 K.W.H.

14 Normal Operating Head Ft. — Max. 14.9 Ft. — Min. 8.1 Ft.

15 Log Sluice — Size None Material

16 Waste Gates — No. 2 - 11 ft wide steel wheeled

17 Fishway — Size Pool type, concrete & timber crib

18 Canal (X-Section) none Length

19 Description

20 Power House — Location none

21 Penstocks — (No. and Size) none

22 Length ft. — Material Surge Tank

23 Restrictions in use of water, if any: None

24 Wheels and Turbines

No. of Units	Make and Type	Size	Rated H.P. Per Unit	Disch. Sec. ft. Per Unit	Date Installed

25 Shaft — Vertical or Horizontal

River Sebec River at Sebec File No.

APPLICATION FOR DAM REGISTRATION

Dam Registration Number: 791
Date Received: [illegible]
Fee Enclosed: [illegible]
Quad Sheet Name: [illegible]
Quad Sheet Number: [illegible]

Location:

County: Piscataquis

Municipality: Sebec

Name of Dam: Sebec Lake Dam

Name of Impoundment: Sebec Lake

Ownership:

Name of Owner: Bangor Hydro-Electric Company

Name of Agent: (if different from owner)

Address of Owner: 33 State St.
Bangor, Maine 04401

Address:

Telephone Number: 945-5621

Telephone Number:

Description of Dam

Type: Storage

Construction Material: Timber Crib with Concrete Decks
(Concrete, wood, earth)

Year Originally built: Unknown

Year last major repair: 1975

Height: 12 Ft.

Width: 250 Ft.

Spillway type: Overfalling & Gates

Spillway Width: Crest Length 170 Ft.

Impounding Capacity: 36800
(Acre-feet)

Drawdown available: 6
(feet)

Fish Passage available?: Yes

Installed Electrical Generating Cap: 0

Purposes for which stored water is used: Augments Flow of Piscataquis/Penobscot Rivers for Power Generation.

Most recent Inspection by Qualified Engineer (Date): Fall 197[illegible]

Name and Address of Engineer: Richard E. [illegible], [illegible]

[illegible]:

[illegible]

SUMMARY OF DATA AND CORRESPONDENCE

DATE	SUBJECT
3-16-77	Dam registration sheet from Soil and Water Conservation Commission
	Dam Inventory sheet from P.U.C. and USGS
1882	Plan of Sebec Village from Colby Atlas
1977	Stream Flow Records at Sebec From USGS Water Resources Data for Maine Water, Year 1977
1970	Sebec Lake Survey and Chart by Department of Inland Fisheries and Game

SEBEC DAM

EXISTING PLANS

On file with Bangor Hydro-Electric Company:

1. Sebec Lake Dam, Proposed Concrete Forebay, Changes to Accommodate Fishway M-3092A, September 1, 1978

2. Sebec Lake Dam, Proposed Concrete Forebay, M-3092, August 29, 1977

3. Sebec Dam, General Plan, Sebec, Maine, M-2061A, Nov. 19, 1975

4. Sebec Dam, General Plan, Sebec, Maine, M-2061, January 23, 1961

On file with the Maine Office of Energy Resources:

1. Survey, Excavation and General Plan, Sebec Power Station and Dam for Boston Excelsior Co., Milo, Maine, August 20, 1920

2. Excavation for Dam and Tail Race, Sebec Power Station and Dam for Boston Excelsior Co., Milo, Maine, August 21, 1920

3. Plan and Section of Large Gates and Frames for Boston Excelsior Co., Milo, Maine, Dam at Sebec, Maine, September 1920

4. Plan of Station and Headgates, Sebec Plant for Milo Light and Power Co., December 30, 1920

5. Sections of Flume, Dam, etc., Sebec Plant for Milo Light and Power Co., December 15, 1920

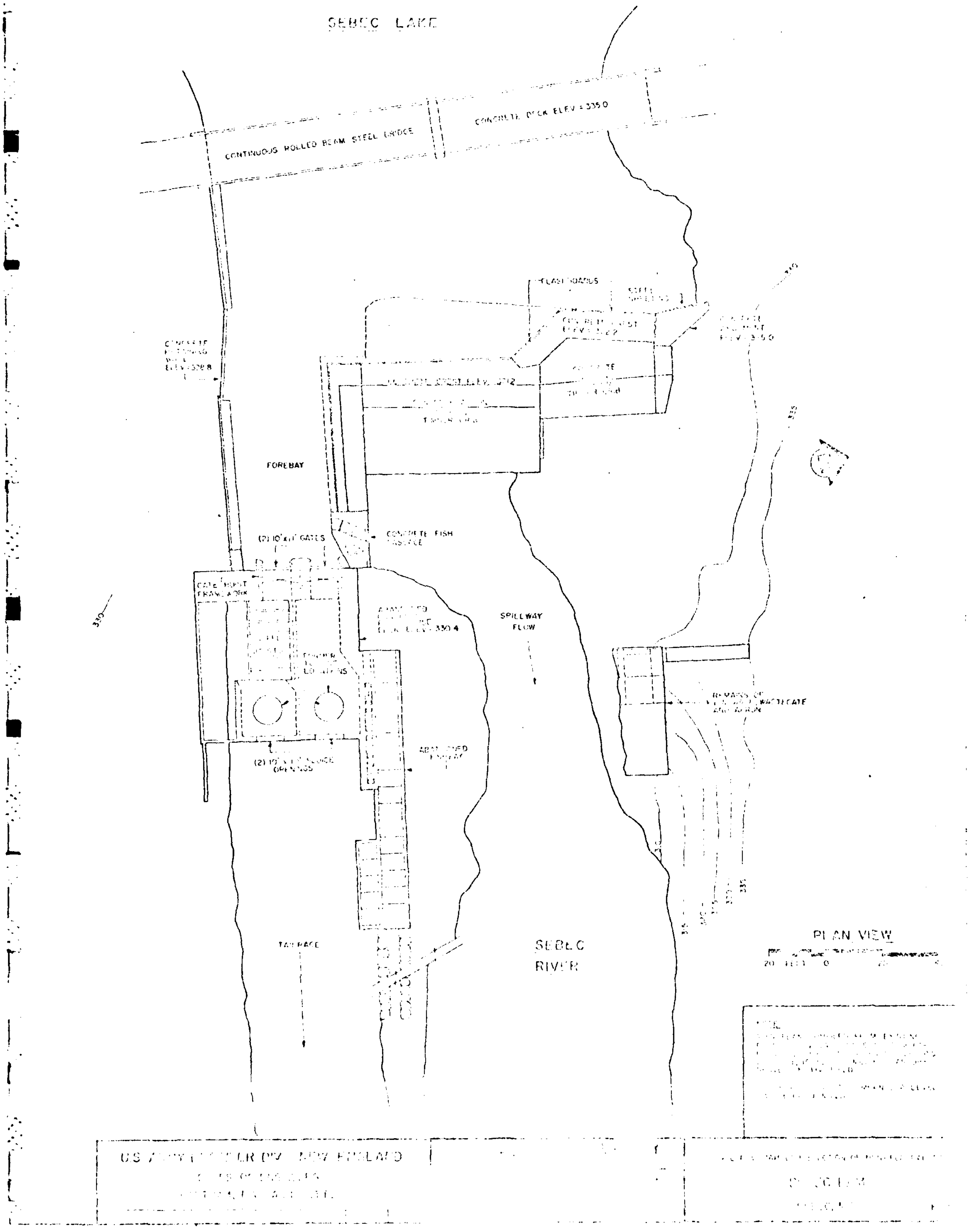
6. Transverse Sections of Flume and Fishway, Sebec Plant for Milo Light and Power Co., January 12, 1921

7. Plan and Section of Fishway, Sebec Plant for Milo Light and Power Co., December 22, 1920

8. General Plan and Elevation, Sebec Plant for Milo Light and Power Co., December 13, 1920

9. Water Racks and Fishway Gates, Sebec Plant for Milo Light and Power Co., January 20, 1921

10. Waste Way and Log Sluice, Sebec Plant for Milo Light and Power Co., October 20, 1920


SEBEC LAKE
CONTINUOUS ROLLED BEAM STEEL BRIDGE
FOREBAY
(2) 10'x11' GATES
CONCRETE FISH
GATE HOIST
FRAMEWORK
SPILLWAY
FLOW
(2) 10'x11' SLUICE
OPENINGS
TAILRACE
SEBEC
RIVER
PLAN VIEW
US ARMY ENGINEER DIV NEW ENGLAND

APPENDIX B

ENGINEERING DATA

PROJECT		DATE	
PROJECT FEATURE		NAME	
DISCIPLINE		NAME	

AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	
a. Super Structure	
Bearings	
Anchor Bolts	
Bridge Seat	
Longitudinal Members	
Underside of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	
Expansion Joints	
Paint	
b. Abutment & Piers	N.A.
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	

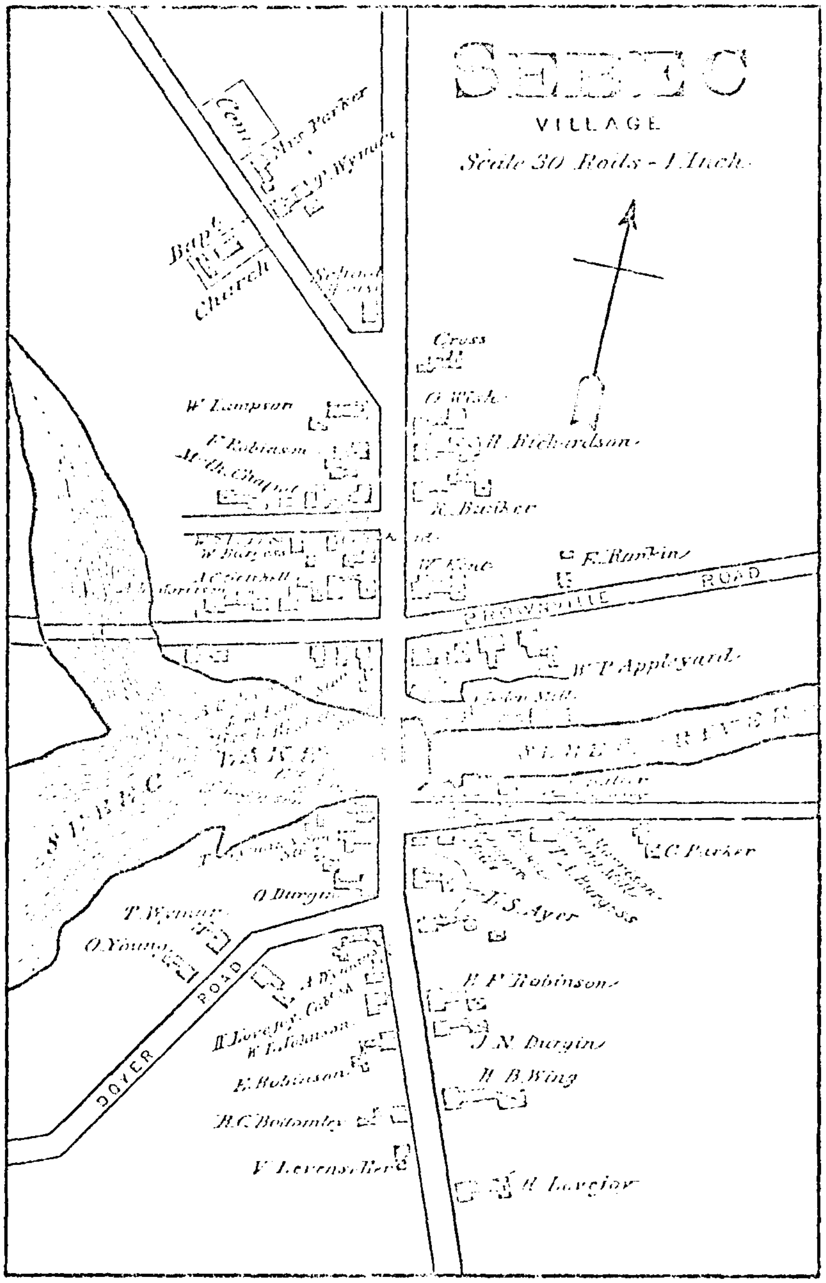
PERIODIC INSPECTION CHECKLIST

PROJECT [illegible] DATE [illegible]

PROJECT FEATURE [illegible] NAME [illegible]

DISCIPLINE [illegible] NAME [illegible]

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	
General Condition	Good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Approach Channel	[illegible]
b. Weir and Training Walls	
General Condition of Concrete	[illegible]
Rust or Staining	[illegible]
Spalling	[illegible]
Any Visible Reinforcing	No
Any Seepage or Efflorescence	[illegible]
Drain Holes	
c. Discharge Channel	[illegible]
General Condition	Good
Loose Rock Overhanging Channel	[illegible]
Trees Overhanging Channel	None of importance
Floor of Channel	Not visible
Other Obstructions	No

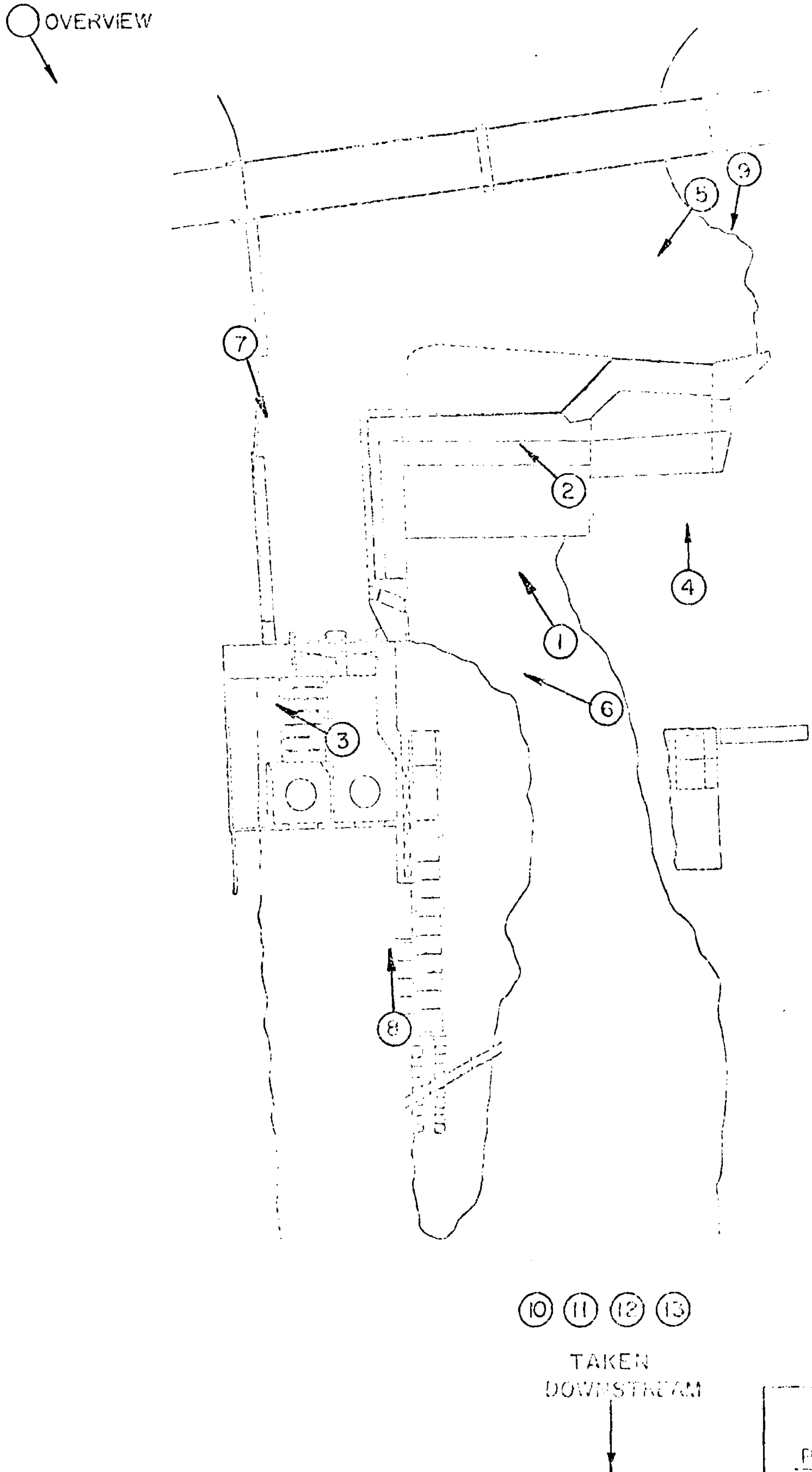


JAMES W. SEWALL CO.

[illegible]

APPENDIX C

DETAIL PHOTOGRAPHS



SEELEC DAM

PHOTO LOCATION PLAN

APPENDIX D

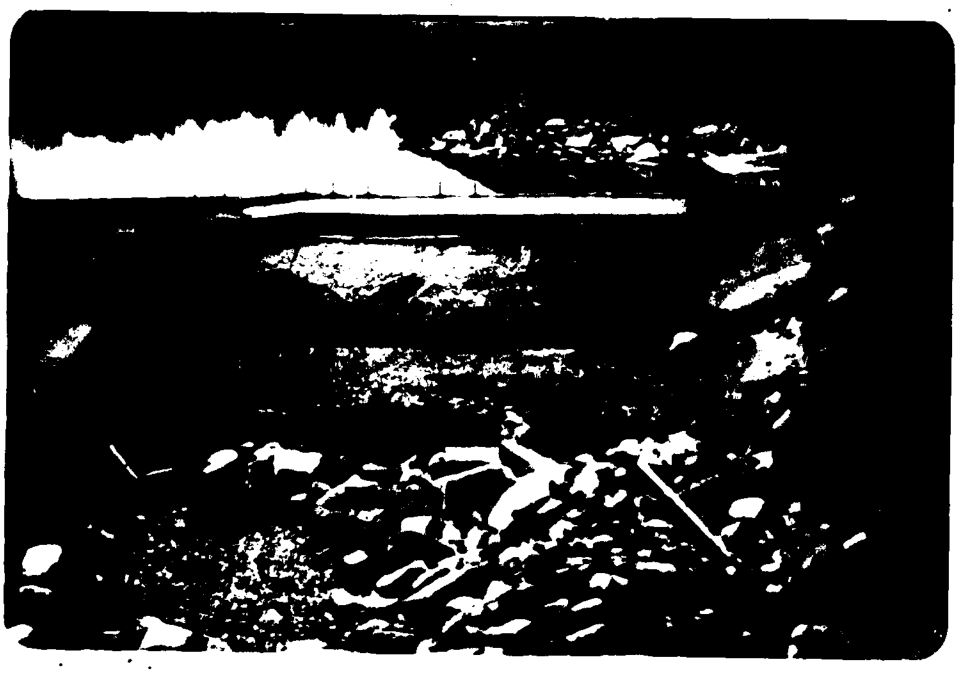
HYDRAULIC/HYDROLOGIC COMPUTATIONS

1. Rock-filled Timber Cribwork Visible Under Concrete

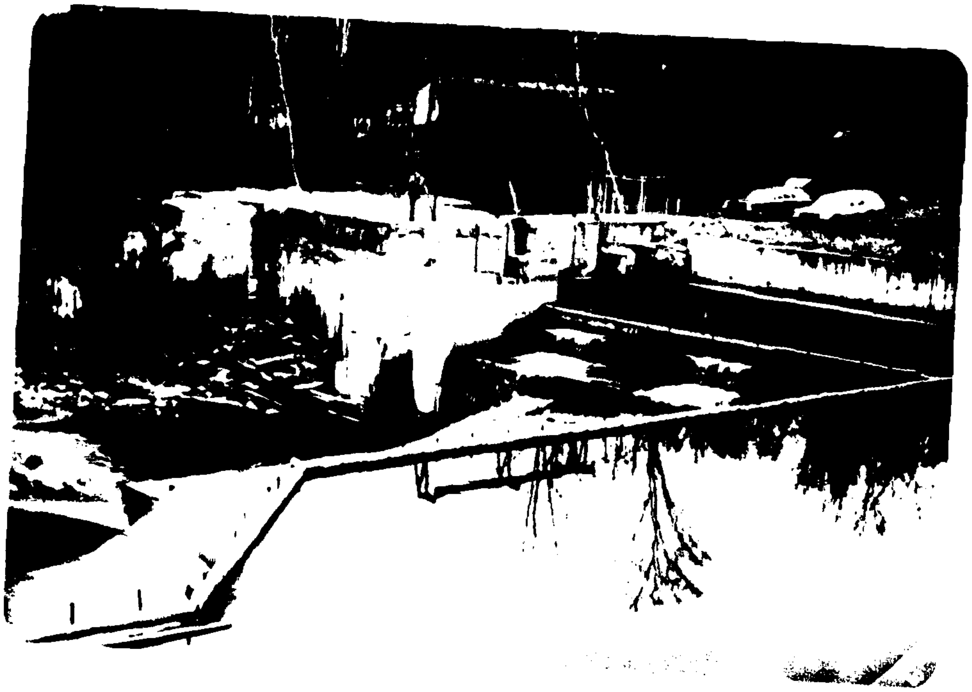
2. Downstream Side of Concrete Capped Spillway Crest.
Concrete Apron at Left Foreground.

U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	Sebec Dam ME 00163 Sebec, Maine Nov. 4, 1980
JAMES W. SEWALL COMPANY CONSULTANTS OLD TOWN, MAINE		C-2

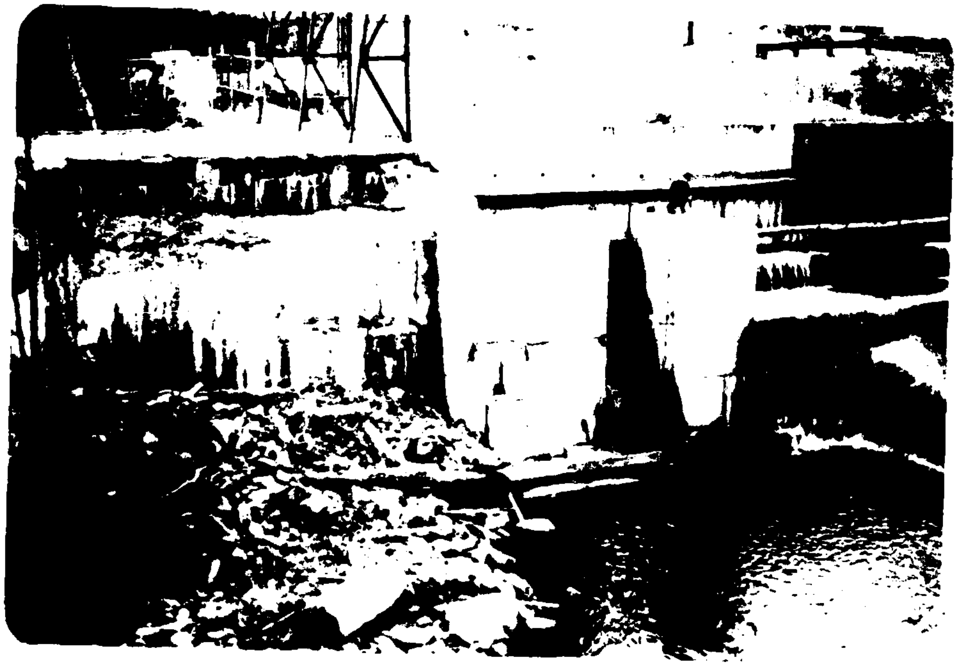
3. Exposed Bedrock at Right Abutment. Steel Joists Supported Former Powerhouse.



4. Area at Left Abutment



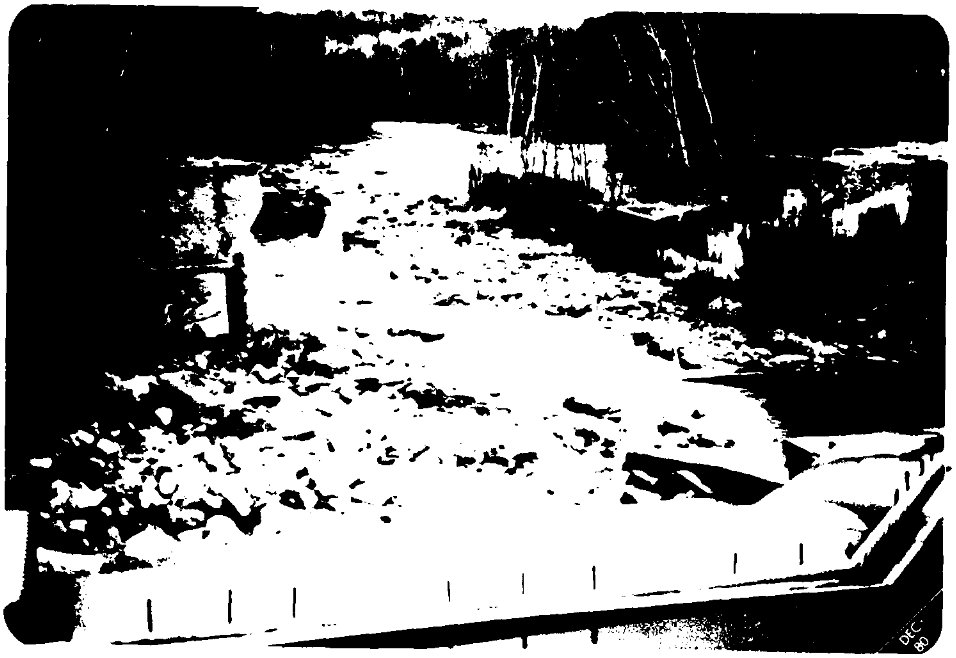
5. View of Forebay at Right, Gate Structure and Substructure of Former Power Station at Center Behind Uncompleted Fish Passage.



6. Uncompleted Fish Passage Adjacent to Power Station Substructure.

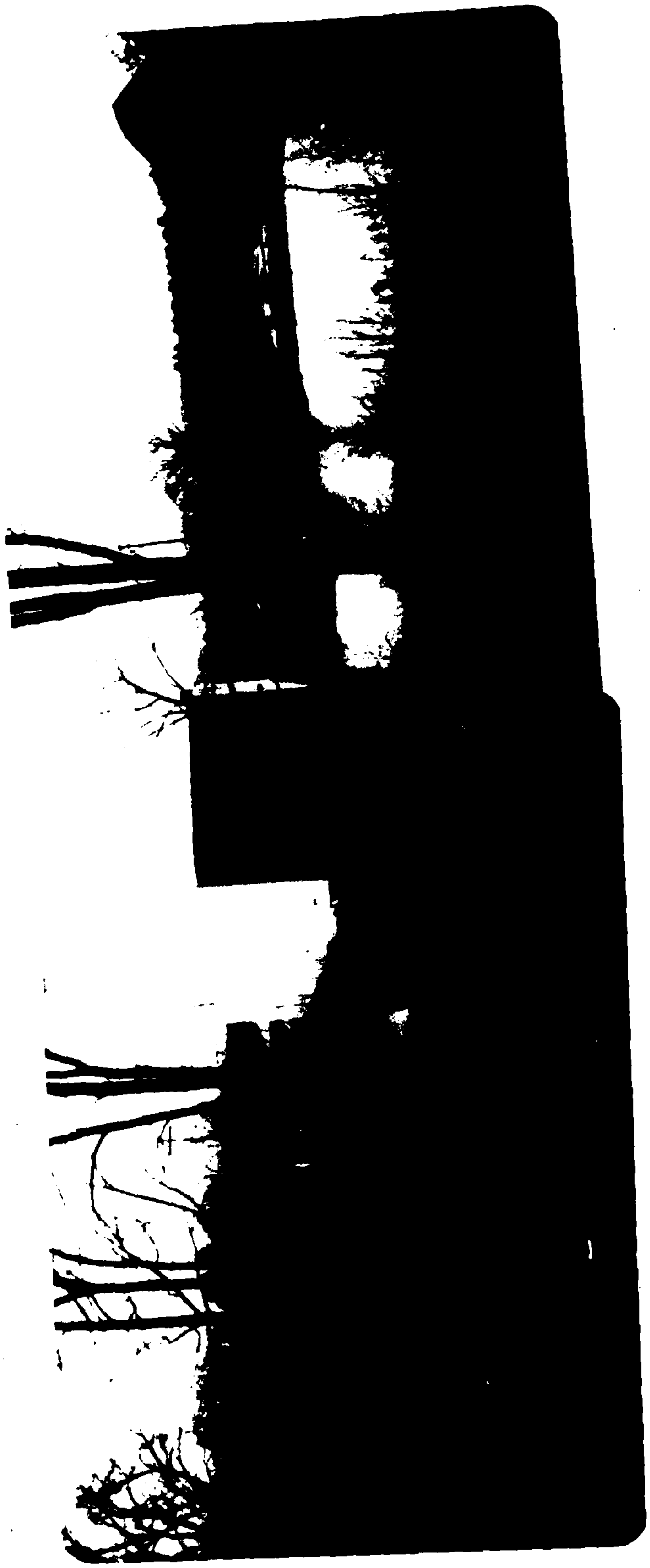
7. Sluice Gates at End of Forebay

8. Outlet Openings in Downstream Foundation Wall of Power Station at Left, Abandoned Fishway at Right.



9. Original Riverbed Below Spillway Section of Dam. Abandoned Fishway and Masonry Training Wall at Right, Remains of Wastegate Section of Former Dam at Left Bank.

10. Railroad Bridge Crossing Sebec River In Milo.



11. & 12. Two Bridges Carry Main Street, Milo, Over the Sebec River

ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS JAMES W. SEWALL COMPANY CONSULTANTS OLD TOWN, MAINE	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	Sebec Dam ME 00163 Sebec, Maine Nov. 4, 1980 C-7

13. Timber Crib Dam Above the Westerly Main Street Bridge in Milo.

RMY ENGINEER DIV, NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	Sebec Dam ME 00163 Sebec, Maine Nov. 4, 1980
JAMES W. SEWALL COMPANY CONSULTANTS OLD TOWN, MAINE		C-8


DRAINAGE AREA
327 SQ MILES
PRIMARY
IMPACT
AREA
SEBEC DAM
USGS QUADRANGLE
1954
1:250,000

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet ___ of ___

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itation ___ Job No. ___

ated by ___ Checked by ___ Date ___

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet [illegible] of [illegible]

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...ed by [illegible] Checked by [illegible] Date [illegible]

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JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet ____ of ____

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JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet 73 of

ct [illegible]

tation [illegible] Job No. [illegible]

ted by [illegible] Checked by [illegible] Date [illegible]

A = [illegible] 0.8 y²

y	A	P	R	V	Q	
5	[illegible]	[illegible]	[illegible]	1.4	[illegible]	[illegible]
10	2000	[illegible]	[illegible]	2.2	[illegible]	240
15	[illegible]	[illegible]	9.3	2.6	11,300	1440
[illegible]	7000	[illegible]	12.?	3.0	21,000	2400
20	11,000	50	15.1	3.4	34,000	3400

Reach 3

1 2 3 4

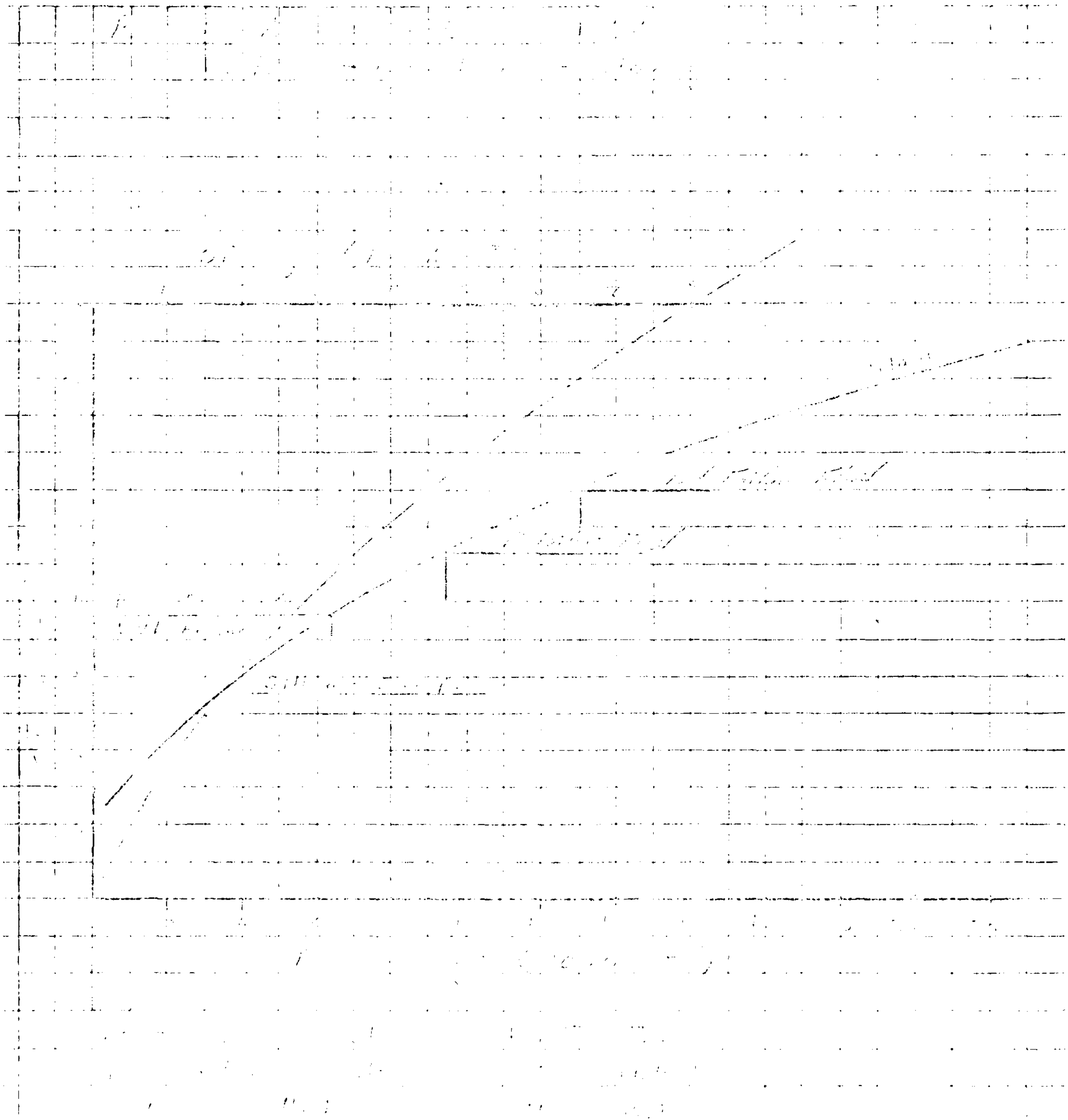
JAMES W. SEWALL COMPANY, OLD TOWN
Civil and Sanitary Engineer

Sheet ___ of ___

Project ___

Computation ___

Computed by ___ Checked by ___ Date ___



JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet ___ of ___

Project ___

Computation ___ Job No. ___

Computed by ___ Checked by ___ Date ___

JAMES W. SEWALL COMPANY, OLD TOWN, [illegible]
Civil and Sanitary Engineers

Sheet [illegible] of [illegible]

Subject [illegible]

Computation [illegible]

Job No. [illegible]

Computed by [illegible] Checked by [illegible] Date [illegible]

a) [illegible] (CFP) = [illegible]

b) [illegible] = [illegible] cfs

c) Full spillway [illegible] = [illegible] cfs
about 32 [illegible]
[illegible]

d) AT [illegible] above
spillway crest [illegible] = 3.5.5' [illegible]

e) [illegible] capacity of Stoplog [illegible] with
[illegible] = [illegible] cfs
at full spillway stage.

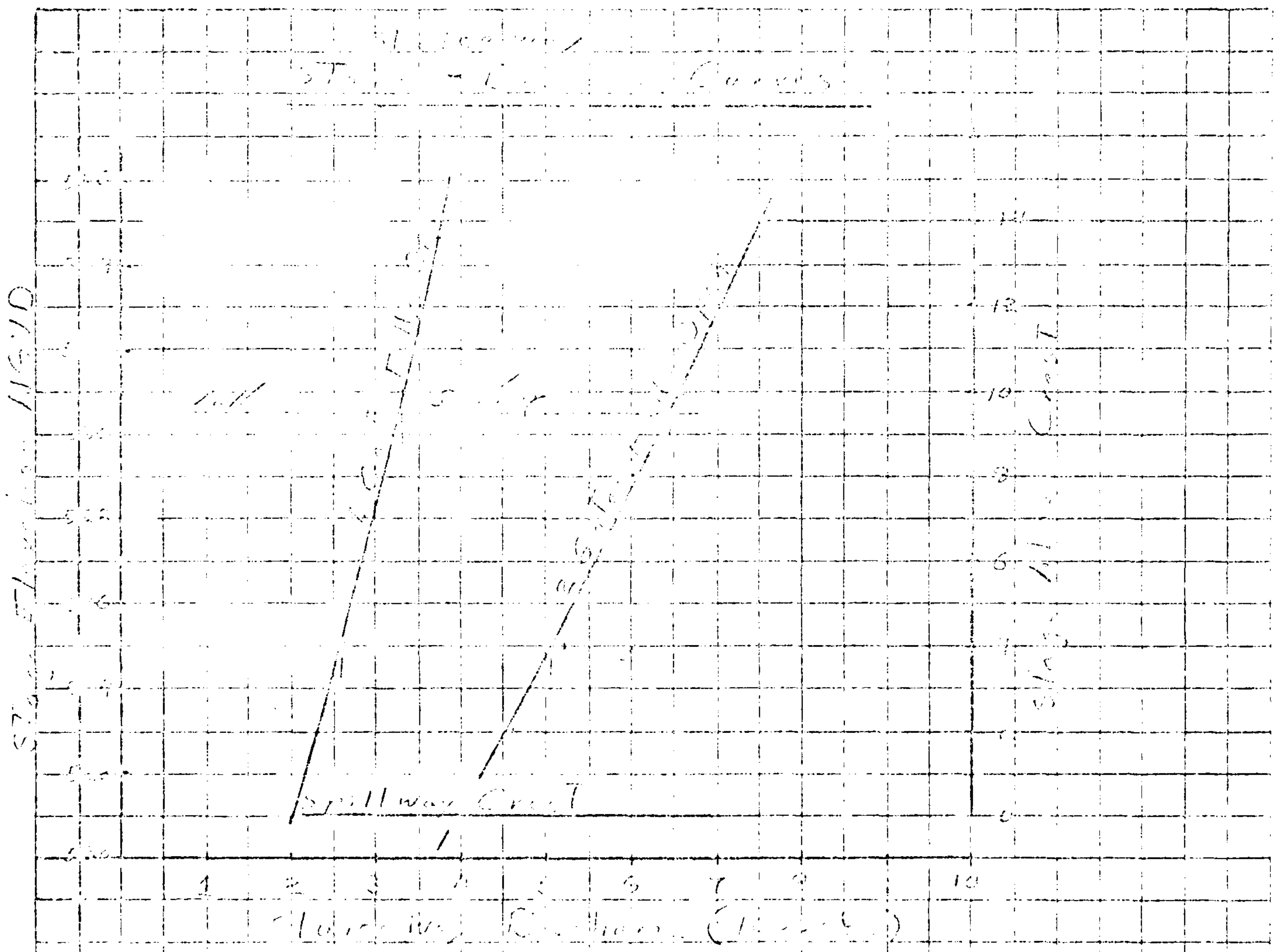
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet 7 of [illegible]

Subject [illegible]

Computation [illegible] Job No. [illegible]

Computed by [illegible] Checked by [illegible] Date [illegible]



JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet ___ of ___

Subject ______________________

Computation ______________________ Job No. ______________________

Computed by ______________ Checked by ______________ Date ______________

d)

$Q = K L T_1 (h_1^2 - h_2^2)$

$L = 16$

$h_1 = Y + (\quad) = Y + 0.7$

$h_2 = Y + (\quad - 300) = Y + 11$

2		16		
4		16	2000	

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet ___ of ___

Subject ___

Computation ___ Job No. ___

Computed by ___ Checked by ___ Date ___

$$(1 - \frac{27.94}{\ldots}) = 52,947 \text{ cfs}$$

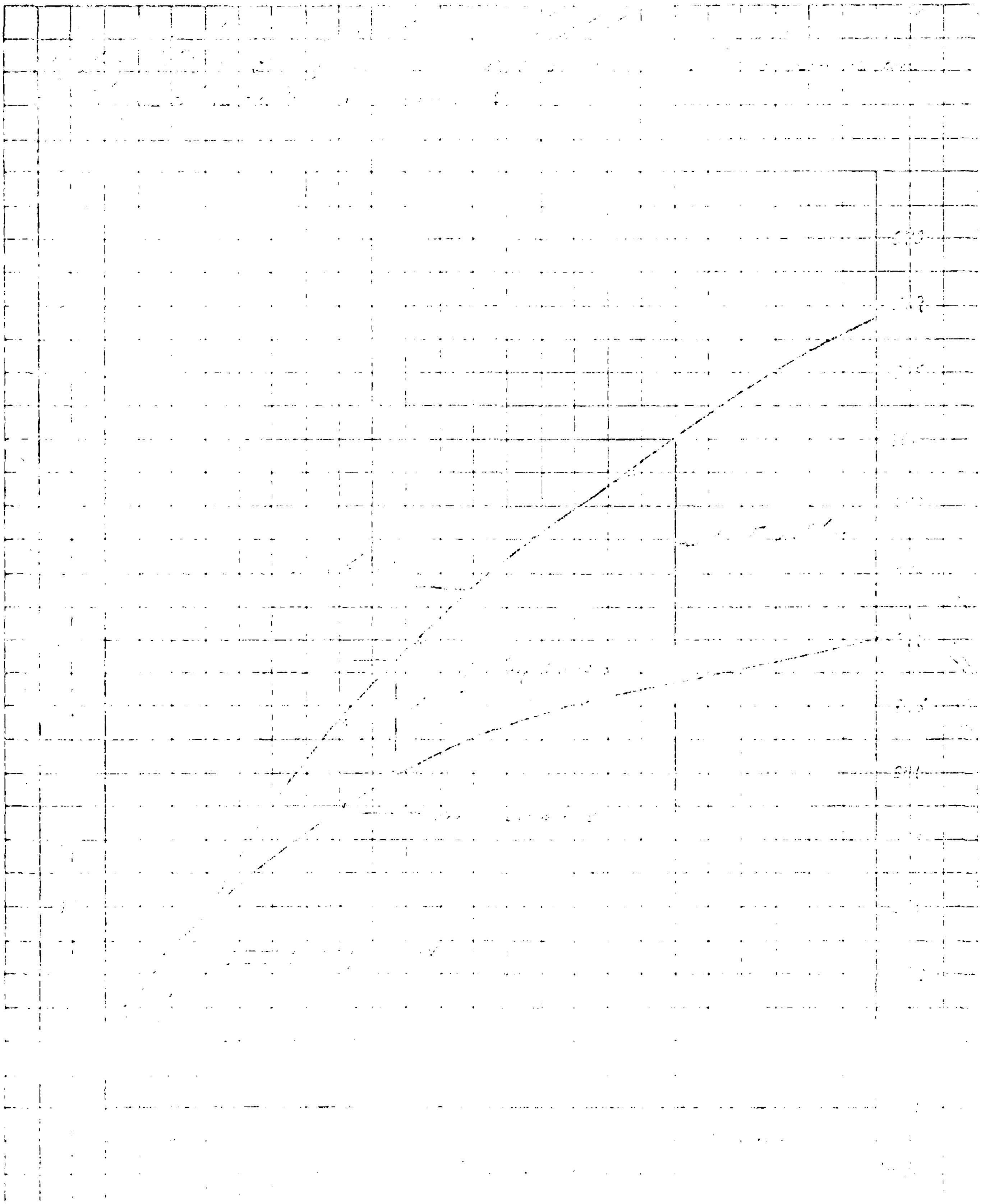
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet ____ of ____

Subject ____________________

Computation ____________________ Job No. ____________

Computed by ____________ Checked by ____________ Date ____________



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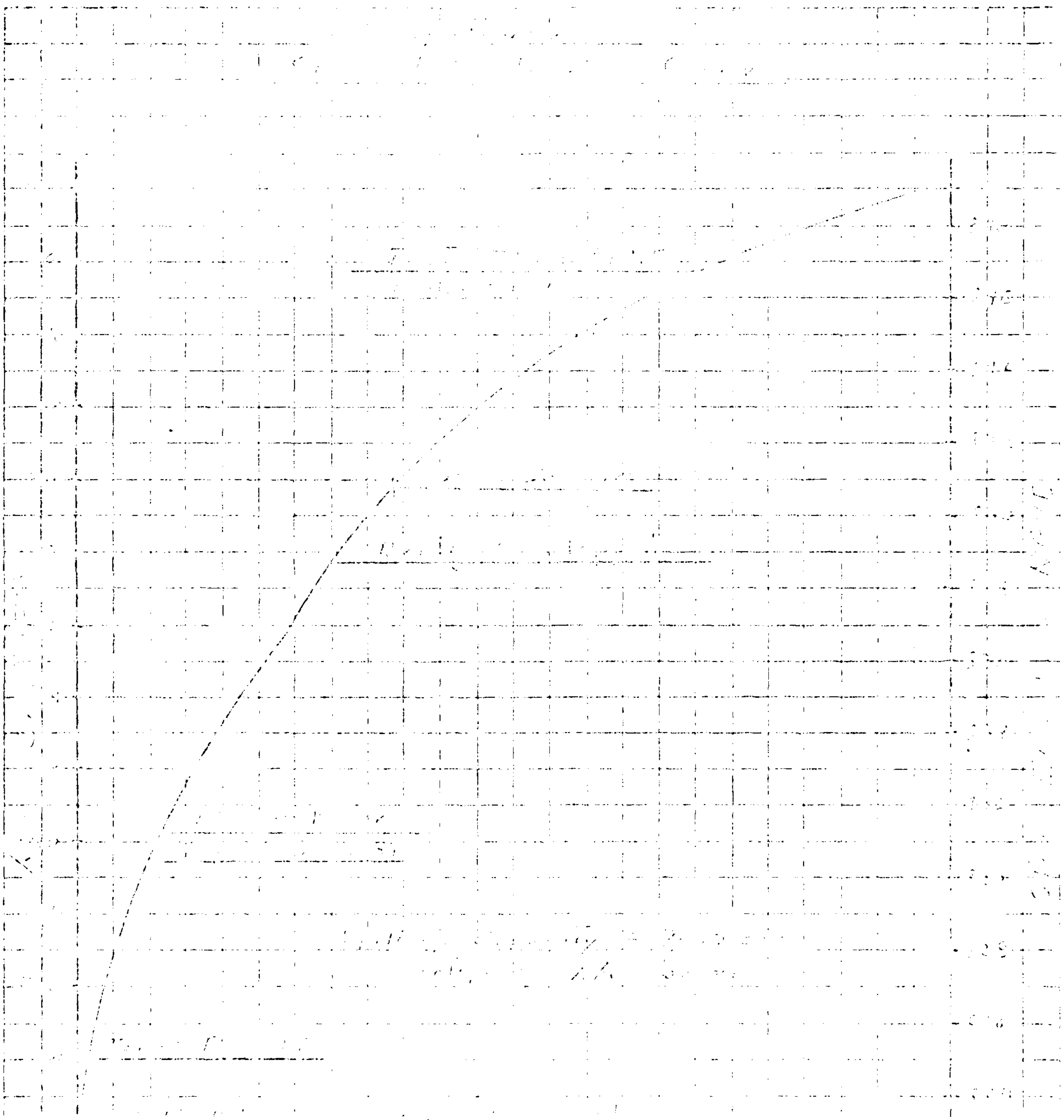
Civil and Sanitary Engineers

Sheet ____ of ____

Subject ____

Computation ____ Job No. ____

Computed by ____ Checked by ____ Date ____



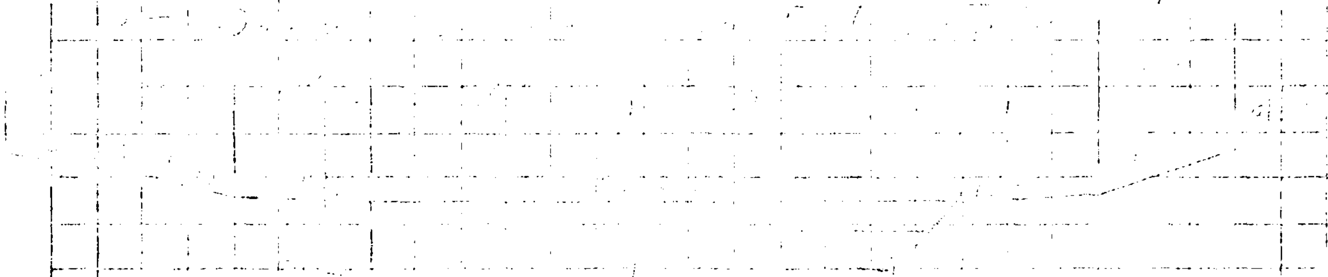
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet [illegible] of [illegible]

Subject [illegible]

Computation [illegible] Job No. [illegible]

Computed by [illegible] Checked by [illegible] Date [illegible]



For $y \geq 15$ [illegible]

[illegible]

[illegible]

$L = $ [illegible] $= 75 + 67 = 142$

[illegible] $= 2 - 2$

[illegible]

[illegible] $y = 15$

[illegible]

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet ___ of ___

Subject ___

Computation ___ Job No. ___

Computed by ___ Checked by ___ Date ___

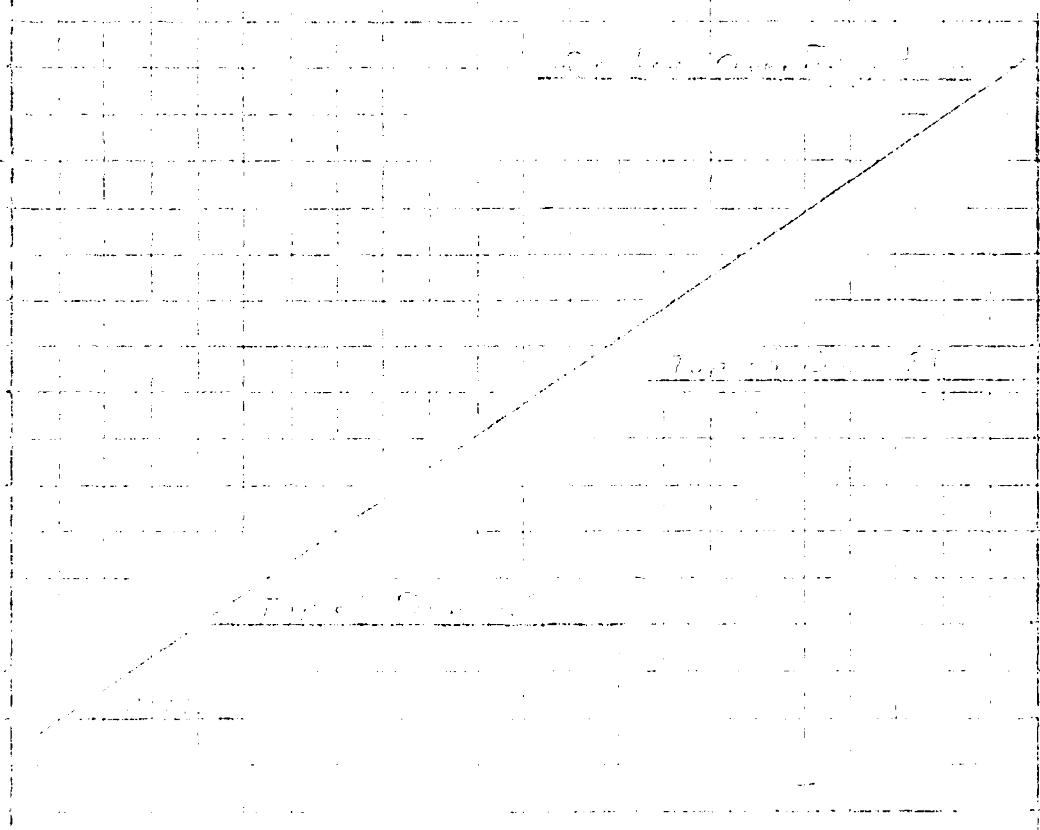
JAMES M. ... Civil and Sanitary Engineers

Sheet ____

Subject ____

Computation ____

Computed by ____ Checked by ____ Date ____



Subject

Computation

Computed by

Civil and Sanitary Engineers

Checked by

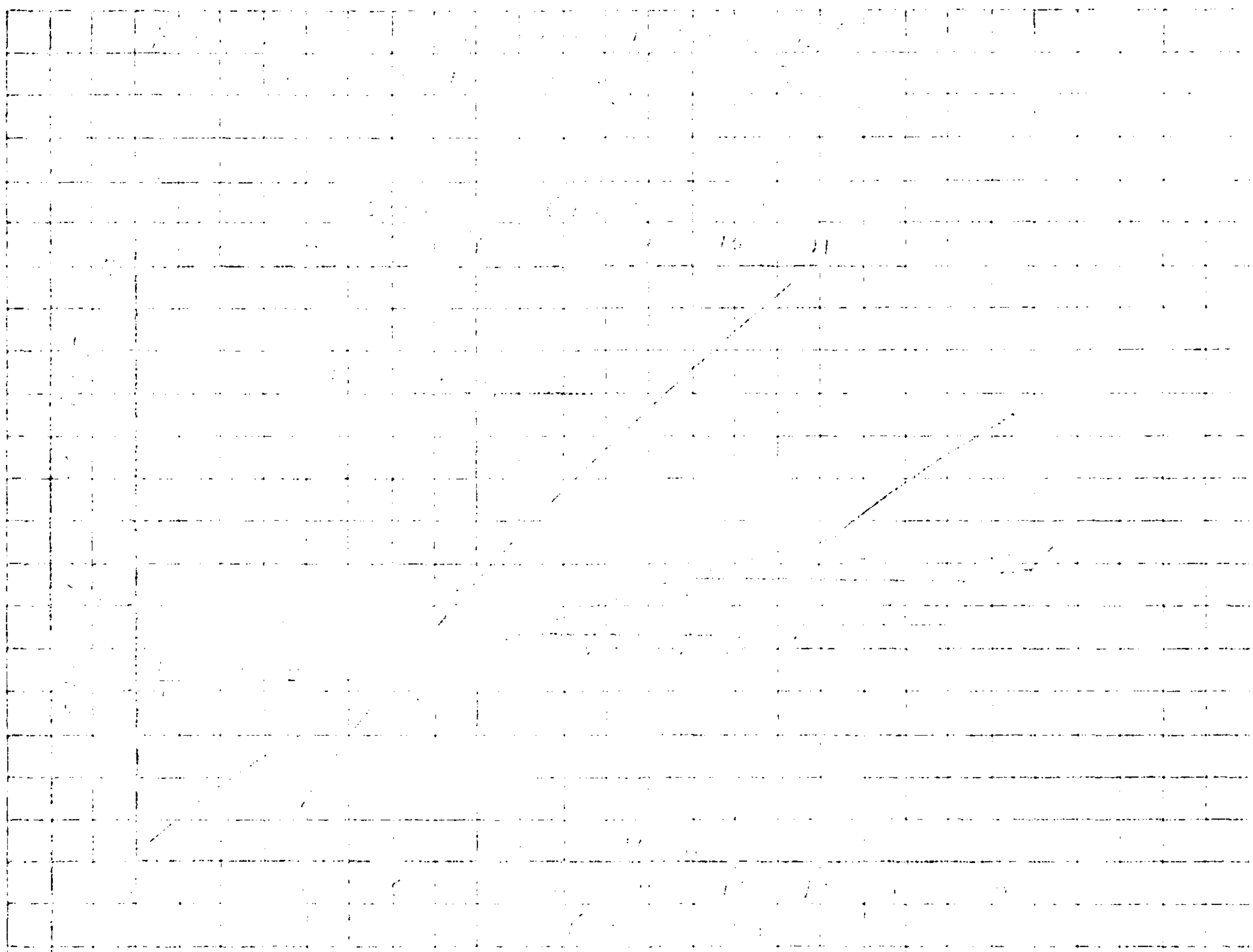
JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet ___ of ___

Subject ______________________________

Computation ______________________________ Job No. ____________

Computed by ____________ Checked by ____________ Date ____________



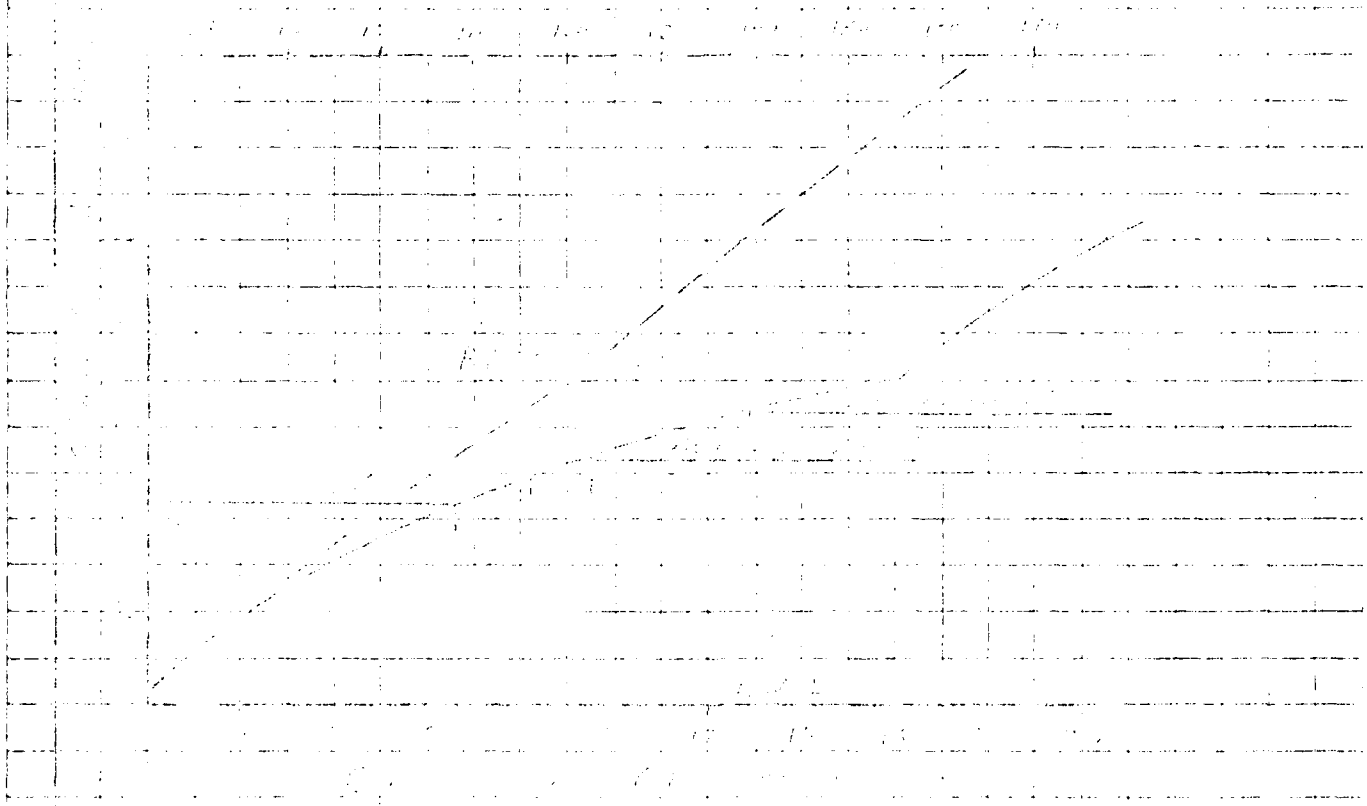
JAMES M. SEWELL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet ___ of ___

Subject ___

Computation ___ Job No. ___

Computed by ___ Checked by ___ Date ___



JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet ____ of ____

Subject ____

Computation ____ Job No. ____

Computed by ____ Checked by ____ Date ____

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet ____ of ____

Subject ____________________

Computation ____________________ Job No. ____________________

Computed by ____________ Checked by ____________ Date ____________

Subject ___

Computation ___ Job No. ___

Computed by ___ Checked by ___ Date ___

JAMES W. SEWALL COMPANY, OLD TOWN, MAINE
Civil and Sanitary Engineers

Sheet ____ of ____

Subject ____________________

Computation ____________________

Computed by ____________ Checked by ____________ Date ____________

JAMES W. S[illegible] COMPANY, [illegible]
Civil and Sanitary Engineers

Sheet ___ of ___

Subject [illegible]

Computation [illegible] Job No. [illegible]

Computed by [illegible] Checked by [illegible] Date [illegible]

[illegible] $L = 10$

[illegible] $= 300$ [illegible]

[illegible]

Crack A [illegible] 5 FT [illegible]

[illegible] 12 FT [illegible]

[illegible] 10 [illegible]

[illegible] 8 FT [illegible]

[illegible]

PRELIMINARY GUIDANCE

FOR ESTIMATING

MAXIMUM PROBABLE DISCHARGES

IN

PHASE I DAM SAFETY

INVESTIGATIONS

New England Division
Corps of Engineers

March 1978

[illegible]

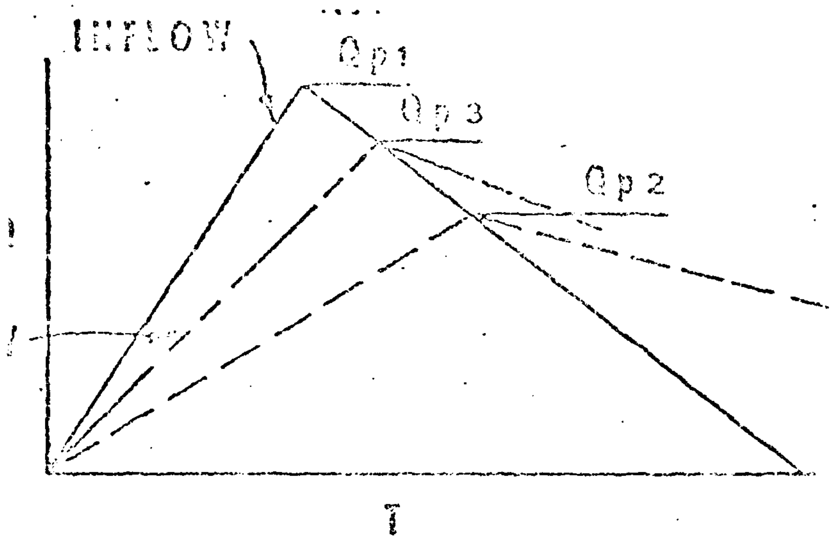
[illegible]

	Project	Q (cfs)	D.A. (sq. mi.)	MPF cfs/sq. mi.
1.	Hall Meadow Brook	26,000	17.2	1,546
2.	East Branch	15,500	9.25	1,675
3.	Thomaston	158,000	97.2	1,625
4.	Northfield Brook	9,000	5.7	1,580
5.	Black Rock	35,000	20.4	1,715
6.	Hancock Brook	20,700	12.0	1,725
7.	Hop Brook	26,400	16.4	1,610
8.	Tully	47,000	50.0	940
9.	Barre Falls	61,000	55.0	1,109
10.	Conant Brook	11,900	7.8	1,525
11.	Knightville	160,000	162.0	987
12.	Littleville	98,000	52.3	1,870
13.	Colebrook River	165,000	118.0	1,400
14.	Mad River	30,000	18.2	1,650
15.	Sucker Brook	6,500	3.43	1,895
16.	Union Village	110,000	126.0	873
17.	North Hartland	199,000	220.0	904
18.	North Springfield	157,000	158.0	994
19.	Ball Mountain	190,000	172.0	1,105
20.	Townshend	228,000	106.0(278 total)	820
21.	Surry Mountain	63,000	100.0	630
22.	Otter Brook	45,000	47.0	957
23.	Birch Hill	88,500	175.0	505
24.	East Brimfield	73,900	67.5	1,095
25.	Westville	38,400	99.5(32 net)	1,200
26.	West Thompson	85,000	173.5(74 net)	1,150
27.	Hodges Village	35,600	31.1	1,145
28.	Buffumville	36,500	26.5	1,377
29.	Mansfield Hollow	125,000	159.0	786
30.	West Hill	26,000	28.0	928
31.	Franklin Falls	210,000	1000.0	210
32.	Blackwater	66,500	128.0	520
33.	Hopkinton	135,000	426.0	316
34.	Everett	68,000	64.0	1,062
35.	[illegible]	[illegible]	44.0	[illegible]

[illegible]
[illegible]
[illegible]
([illegible])

	River	SPF (cfs)	D.A. (sq. mi.)	[illegible] (cfs/sq. mi.)
1.	Pawtuxet River	19,000	200	190
2.	Mill River (R.I.)	[illegible],500	34	500
3.	Peters River (R.I.)	3,200	13	490
4.	Kettle Brook	8,000	30	530
5.	Sudbury River.	11,700	86	270
6.	Indian Brook (Hopk.)	1,000	5.9	340
7.	Charles River.	6,000	184	65
8.	Blackstone River.	43,000	416	200
9.	Quinebaug River	55,000	331	330

ESTIMATING EFFECT OF SURCHARGE STORAGE ON MAXIMUM PROBABLE DISCHARGES



EP 1: Determine Peak Inflow (Q_{p1}) from Guide Curves.

EP 2: a. Determine Surcharge Height To Pass "Q_{p1}".

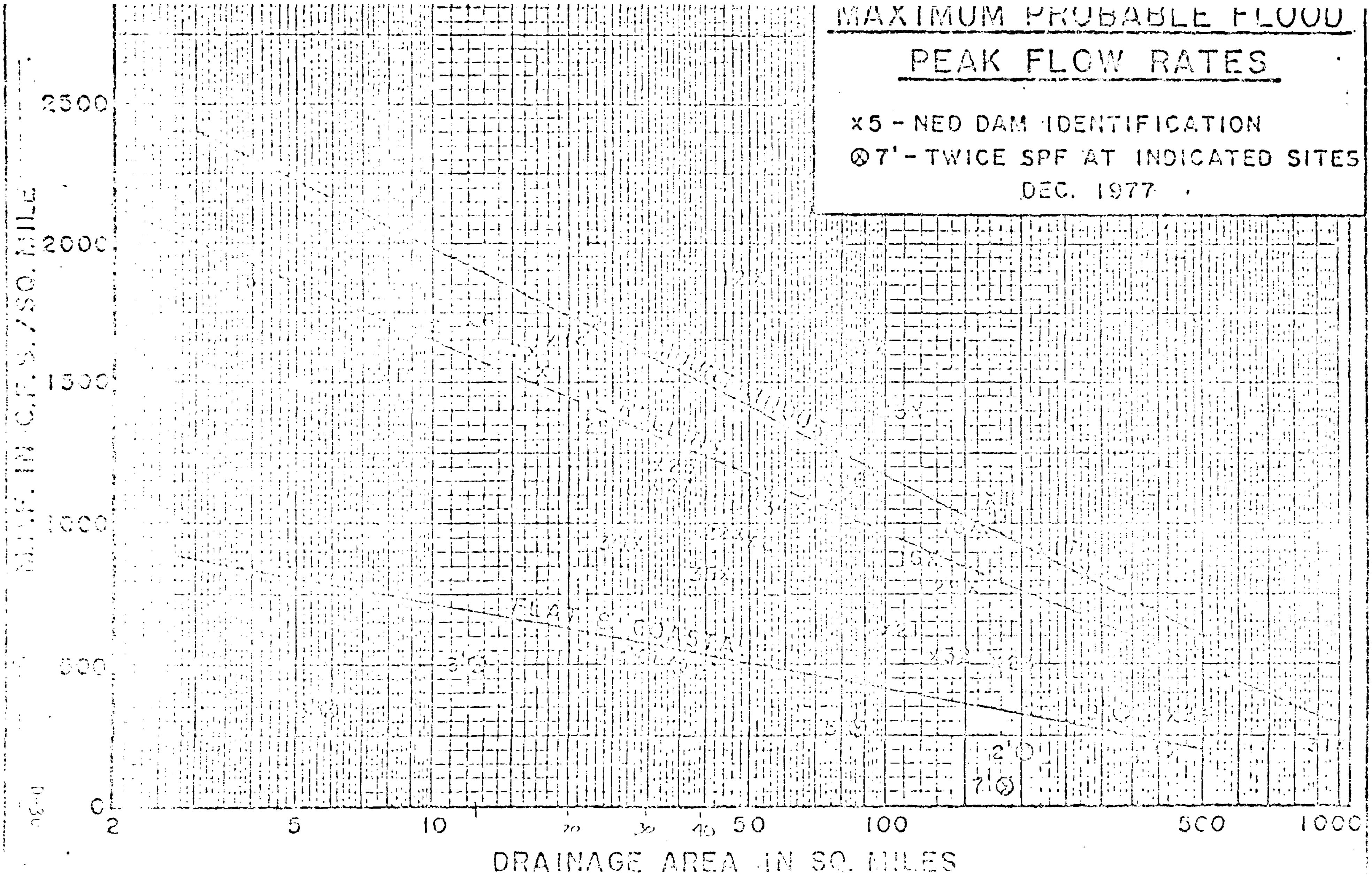
b. Determine <u>Volume of Surcharge ($STOR_1$)</u> In Inches of Runoff.

c. Maximum Probable Flood Runoff In New England equals Approx. 19", Therefore

$$Q_{p2} = Q_{p1} \times \left(1 - \frac{STOR_1}{19}\right)$$

EP 3: a. Determine Surcharge Height and "$STOR_2$" To Pass "Q_{p2}"

b. Average "$STOR_1$" and "$STOR_2$" and Determine [illegible] and Resulting Peak Outflow "Q_{p3}".


MAXIMUM PROBABLE FLOOD
PEAK FLOW RATES
x5 - NED DAM IDENTIFICATION
⊗7' - TWICE SPF AT INDICATED SITES
DEC. 1977
C.F.S./SQ. MILE
2500
2000
1500
1000
500
0
2
5
10
50
100
500
1000
DRAINAGE AREA IN SQ. MILES
FLAT & COASTAL

AD-A155 796 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS SEBEC DAM ME 00163 PE..(U) CORPS OF ENGINEERS WALTHAM MA NEW ENGLAND DIV JUN 81 2/2

UNCLASSIFIED F/G 13/13 NL

END

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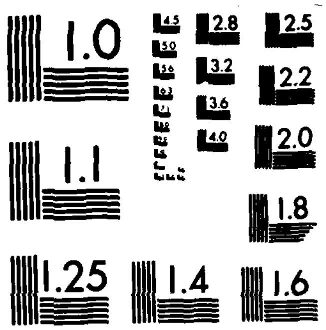
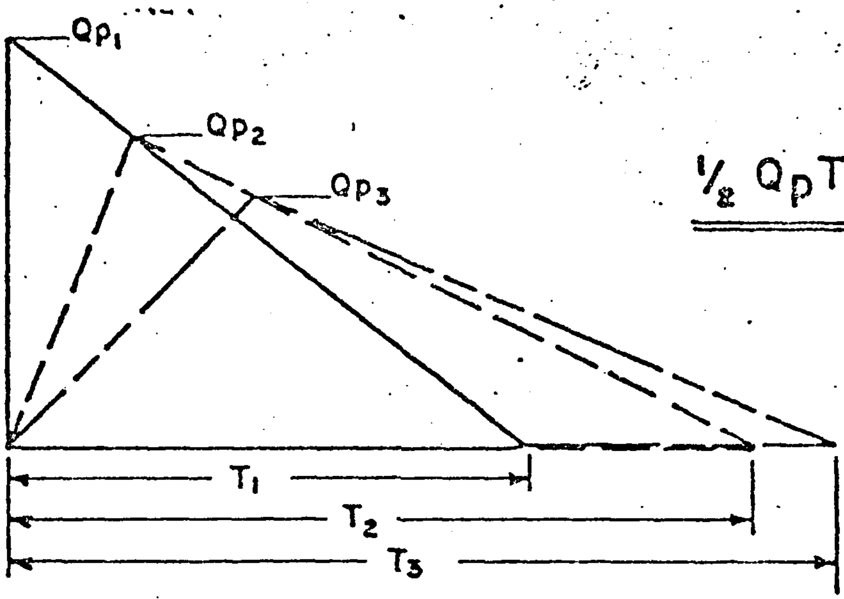


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

"RULE OF THUMB" GUIDANCE FOR ESTIMATING DOWNSTREAM DAM FAILURE HYDROGRAPHS



$$\frac{1}{2} Q_p T = 12\,S$$

STEP 1: DETERMINE OR ESTIMATE RESERVOIR STORAGE (S) IN AC-FT AT TIME OF FAILURE.

STEP 2: DETERMINE PEAK FAILURE OUTFLOW (Q_{p1}).

$$Qp_1 = \frac{8}{27} W_b \sqrt{g}\; Y_o^{3/2}$$

W_b = BREACH WIDTH - SUGGEST VALUE NOT GREATER THAN 40% OF DAM LENGTH ACROSS RIVER AT MID HEIGHT.

Y_o = TOTAL HEIGHT FROM RIVER BED TO POOL LEVEL AT FAILURE.

STEP 3: USING USGS TOPO OR OTHER DATA, DEVELOP REPRESENTATIVE STAGE-DISCHARGE RATING FOR SELECTED DOWNSTREAM RIVER REACH.

STEP 4: ESTIMATE REACH OUTFLOW (Q_{p2}) USING FOLLOWING ITERATION.

A. APPLY Q_{p1} TO STAGE RATING, DETERMINE STAGE AND ACCOPMANYING VOLUME (V_1) IN REACH IN AC-FT. (NOTE: IF V_1 EXCEEDS 1/2 OF S, SELECT SHORTER REACH.)

B. DETERMINE TRIAL Q_{p2}.

$$Qp_2(\text{TRIAL}) = Qp_1\left(1 - \frac{V_1}{S}\right)$$

C. COMPUTE V_2 USING Q_{p2} (TRIAL).

D. AVERAGE V_1 AND V_2 AND COMPUTE Q_{p2}.

$$Qp_2 = Qp_1\left(1 - \frac{V_{avg}}{S}\right)$$

STEP 5: FOR SUCCEEDING REACHES REPEAT STEPS 3 AND 4.

APRIL 1978

APPENDIX E

INFORMATION AS CONTAINED IN

THE NATIONAL INVENTORY OF DAMS

NOT AVAILABLE AT THIS TIME

END

FILMED

8-85

DTIC